Maintenance Management System (MMS) Client/Server (v4.1.x)

for Alstom Vital Processor Interlocking Systems (VPI® II/iVPI)

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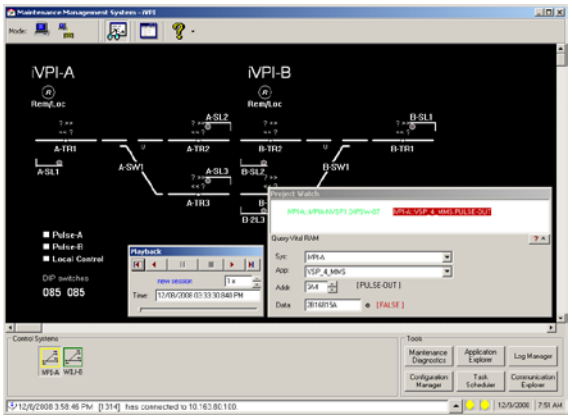

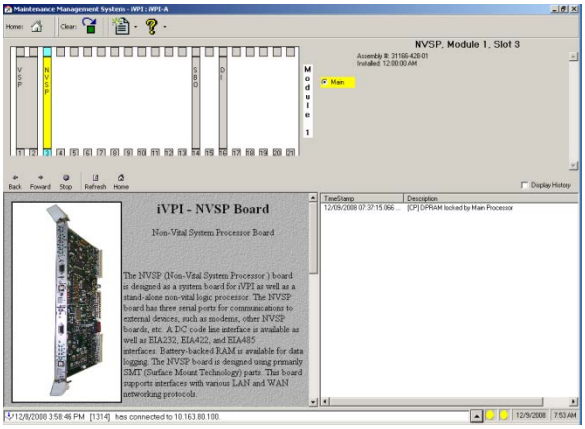
NVSP, Module 1, Slot 3
iVPI - NVSP Board
Non-Vital System Processor Board
The NVSP (Non-Vital System Processor) board is designed as a system board for iVPI as well as a stand-alone non-vital logic processor. The NVSP board has three serial ports for communications to external devices, such as modems, other NVSP boards, etc. A DC code line interface is available as well as EIA232, EIA422, and EIA485 interfaces. Battery-backed RAM is available for data logging. The NVSP board is designed using primarily SMT (Surface Mount Technology) parts. This board supports interfaces with various LAN and WAN networking protocols.

User Manual
P2528

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for Alstom Vital Processor Interlocking Systems (VPI® II/iVPI)

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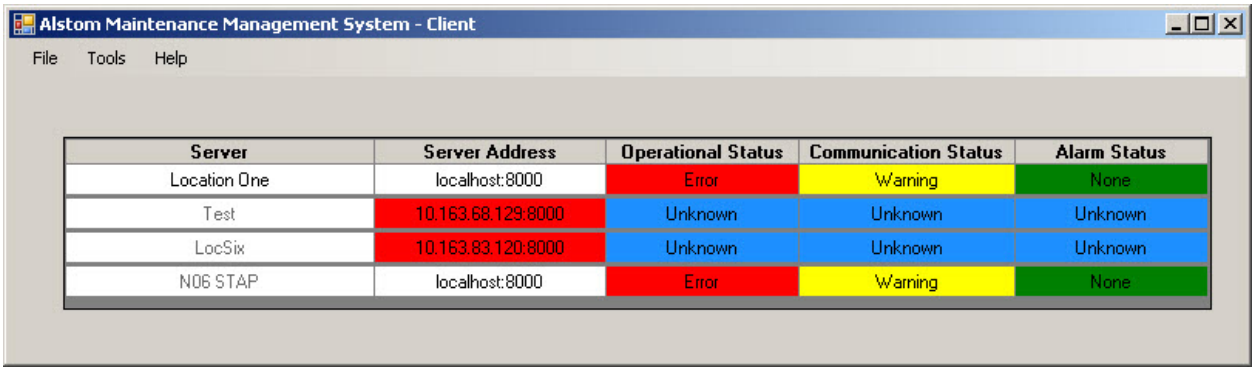

User Manual

Alstom Signaling Inc.

P2528, Rev. B, December 2013, Printed in U.S.A.

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P2528, Maintenance Management System (MMS), Client/Server version (4.1.x) for Alstom Vital Processor Interlocking Systems (VPI® II/iVPI) User Manual

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1–1 through 1–12	December 2013
2–1 through 2–14	December 2013
3–1 through 3–8	December 2013
4–1 through 4–20	December 2013
5–1 through 5–24	December 2013
6–1 through 6–28	December 2013
7–1 through 7–32	December 2013
8–1 through 8-2	December 2013
9–1 through 9-2	December 2013

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PREFACE

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ABOUT THE MANUAL

This manual is intended to provide the necessary information to maintain and ensure proper operation of the Client/Server version (4.1.x) of Maintenance Management System (MMS) for Alstom Vital Processor Interlocking Systems (VPI® II/iVPI).

The information in this manual is arranged into sections. The title and a brief description of each section follow:

Section 1 – GENERAL DESCRIPTION: This section provides general information on the components of MMS.

Section 2 – INSTALLATION: This section describes how to install the MMS Server and MMS Client applications.

Section 3 – MMS SERVER: This section explains how to start the MMS Server application, shut it down, and configure it as needed.

Section 4 – MMS CLIENT MAIN: This section explains how to start the MMS Client Main application, shut it down, and configure it as needed.

Section 5 – MMS EDITOR: This section explains how to use the MMS Editor application.

Section 6 – MMS CLIENT RUNTIME: This section explains how to use the MMS Client Runtime application.

Section 7 – SYMBOLS: This section describes the layout symbols used in the MMS programs.

Section 8 – VPI PORT CONFIGURATION: This section explains how to configure VPI ports to acquire data for MMS.

Section 9 – MMS COMMUNICATION: This section contains block diagrams describing MMS communication.

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MANUAL SPECIAL NOTATIONS

In the Alstom manuals, three methods are used to convey special informational notations. These notations are warnings, cautions, and notes. Both warnings and cautions are readily noticeable by boldface type and a box around the entire informational statement.

Warning

A warning is the most important notation to heed. A warning is used to tell the reader that special attention needs to be paid to the message because if the instructions or advice is not followed when working on the equipment then the result could be either serious harm or death. The sudden, unexpected operation of a switch machine, for example, or the technician contacting the third rail could lead to personal injury or death. An example of a typical warning notice follows:

> **WARNING**
>
> Disconnect motor energy whenever working on switch layout or switch machine. Unexpected operation of machine could cause injury from open gears, electrical shock, or moving switch points.

Caution

A caution statement is used when failure to follow the recommended procedure could result in loss or alteration of data. A typical caution found in a manual is as follows:

> **CAUTION**
>
> Changing session date and time to earlier values may affect the ability of the History Window to store data correctly.

Note

A note is normally used to provide minor additional information to the reader to explain the reason for a given step in a test procedure or to just provide a background detail. An example of the use of a note follows:

Note: This step should be done first to validate the correct information is used.

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TABLE OF CONTENTS

Topic **Page**

SECTION 1 – GENERAL DESCRIPTION 1–1
1.1 SCOPE OF MANUAL 1–1
1.2 OVERVIEW 1–1
1.3 MAINTENANCE MANAGEMENT SYSTEM 1–1
1.4 REQUIREMENTS/FEATURES 1–2
1.5 PRODUCT PART NUMBERS 1–3
1.6 DOCUMENT CONVENTIONS 1–3
1.7 GLOSSARY OF TERMS 1–4
1.8 CONTROL SYSTEM 1–7
1.8.1 VPI® II/iVPI Application 1–7
1.8.2 VPI Communication Ports 1–8
1.9 MMS EDITOR 1–9
1.9.1 MMS Projects 1–9
1.10 MMS SERVER 1–11
1.11 MMS CLIENT 1–12
1.11.1 MMS Client Main 1–12
1.11.2 MMS Client Runtime 1–12

SECTION 2 – INSTALLATION 2–1
2.1 OVERVIEW 2–1
2.2 MMS SERVER INSTALLATION 2–2
2.3 MMS CLIENT INSTALLATION 2–7

SECTION 3 – MMS SERVER 3–1
3.1 OVERVIEW 3–1
3.2 CONNECT TO A VPI SYSTEM 3–1
3.3 MMS SERVER START-UP 3–3
3.4 MMS SERVER OPTIONS 3–4
3.5 MMS SERVER HELP 3–6
3.6 MMM SERVER SHUTDOWN 3–7

SECTION 4 – MMS CLIENT MAIN 4–1
4.1 OVERVIEW 4–1
4.2 MMS CLIENT START-UP 4–1
4.3 MMM CLIENT USER INTERFACE 4–3
4.3.1 Overview 4–3

TABLE OF CONTENTS

Topic	Page
4.3.2 Locations Panel	*4–4*
4.3.3 Tools Menu	*4–5*
4.3.3.1 Security	*4–5*
4.3.3.2 Server Configuration	*4–6*
4.3.3.3 Refresh Server Connections	*4–8*
4.3.3.4 Options	*4–9*
4.3.3.5 Task Scheduler	*4–12*
4.3.4 MMS Client Help	*4–17*
4.4 SECURITY LEVELS	4–18
4.5 MMS CLIENT SHUTDOWN	4–19
SECTION 5 – MMS EDITOR	**5–1**
5.1 OVERVIEW	5–1
5.2 MMS EDITOR USER INTERFACE	5–1
5.3 CONFIGURE MMS EDITOR OPTIONS	5–3
5.4 CREATE A NEW MMS PROJECT	5–6
5.5 BUILD THE LOCATION MODEL	5–10
5.6 IMPORT CAAPE DATA	5–13
5.7 LINK VPI VARIABLES TO SYMBOL PARAMETERS	5–18
5.8 ADD MMS SPECIFIC DATA	5–20
5.9 CREATE A SUMMARY REPORT	5–23
5.10 PRINT A LAYOUT DRAWING	5–24
SECTION 6 – MMS CLIENT RUNTIME	**6–1**
6.1 OVERVIEW	6–1
6.2 ACCESSING MMS CLIENT RUNTIME	6–2
6.3 MMS CLIENT RUNTIME USER INTERFACE	6–3
6.3.1 Main Screen	*6–3*
6.3.1.1 Project Watch Window	*6–5*
6.3.1.2 Settings (Preferences)	*6–7*
6.3.1.3 Help	*6–10*
6.3.1.4 Control Systems	*6–11*
6.3.1.5 Status Bar	*6–11*
6.3.1.6 Tools	*6–12*
6.3.2 Maintenance Diagnostics	*6–13*
6.3.3 Application Explorer	*6–15*
6.3.4 Log Manager	*6–23*
6.3.5 Configuration Manager	*6–25*

TABLE OF CONTENTS

Topic	Page
6.3.6 Network Statistics Screen	*6–27*
SECTION 7 – SYMBOLS	**7–1**
7.1 OVERVIEW	7–1
7.2 TRACK SYMBOLS	7–1
7.2.1 Overlay Track	*7–1*
7.2.2 Non-Coded Track	*7–3*
7.2.3 Coded Track	*7–6*
7.3 SWITCH SYMBOLS	7–9
7.4 LIGHT SYMBOLS	7–12
7.4.1 Color Lights	*7–12*
7.4.2 Position Lights	*7–15*
7.4.3 Search Lights	*7–18*
7.4.4 Semaphore Lights	*7–21*
7.5 MISCELLANEOUS SYMBOLS	7–23
7.5.1 Alternate Traffic	*7–23*
7.5.2 Grade Crossing	*7–24*
7.5.3 Remote/Local Control	*7–26*
7.5.4 Timer	*7–27*
7.5.5 Generic	*7–28*
7.5.6 Direction Indicator	*7–30*
7.5.7 Alarm	*7–31*
7.5.8 Text Box	*7–32*
SECTION 8 – VPI PORT CONFIGURATION	**8-1**
8.1 VITAL BOARD NETWORK PORTS	8-1
8.2 NON-VITAL BOARD NETWORK PORTS	8-1
8.3 COMPILER REPORT OPTIONS	8-2
SECTION 9 – MMS COMMUNICATION	**9-1**
9.1 DATA LOG RETRIEVAL PROCESSING	9-1

LIST OF FIGURES

Figure No.	Title	Page
Figure 2–1.	MMS Server/Client Installation Overview	2–1
Figure 3–1.	CPU II and CSEX4 Diagnostics	3–2
Figure 3–2.	VSP and NVSP Diagnostics	3–2
Figure 4–1.	MMS Client User Interface	4–3
Figure 4–2.	MMS Client, Locations Panel	4–4
Figure 4–3.	MMS Client, Tools Menu	4–5
Figure 4–4.	Cached Login Window	4–5
Figure 4–5.	Server Connection Refresh in Progress	4–8
Figure 5–1.	MMS Editor User Interface	5–1
Figure 6–1.	MMS Main Screen	6–3
Figure 6–2.	Main Screen Project Watch Window Button	6–5
Figure 6–3.	Main Screen Project Watch Window	6–5
Figure 6–4.	Main Screen Settings (Preferences) Button	6–7
Figure 6–5.	Main Screen Settings – General Tab	6–7
Figure 6–6.	Main Screen Settings – Colors / Generic Tab	6–8
Figure 6–7.	Main Screen Settings – Colors / General Tab	6–8
Figure 6–8.	Main Screen Help Menu Button	6–10
Figure 6–9.	Main Screen Control Systems	6–11
Figure 6–10.	Main Screen Status Bar	6–11
Figure 6–11.	Main Screen Tools	6–12
Figure 6–12.	Maintenance Diagnostics Screen	6–13
Figure 6–13.	Application Explorer Screen	6–15
Figure 6–14.	Watch Window Options Menu	6–18
Figure 6–15.	Log Manager Screen	6–23
Figure 6–16.	Configuration Manager Screen	6–25
Figure 6–17.	Communication Explorer – Network Statistics Screen	6–27
Figure 9–1.	Data Log Retrieval Processing	9-2

LIST OF TABLES

Table No.	Title	Page
Table 1–1.	Minimum PC Requirements	1–2
Table 1–2.	Control System Component Requirements	1–2
Table 1–3.	Commercialized Product Part Numbers	1–3
Table 1-4.	Document Conventions	1–3
Table 1–5.	Glossary of Terms	1–4
Table 1–6.	MMS Projects Features Available with Specific VPI® II/iVPI and/or CAAPE Software	1–10
Table 1–7.	MMS Client Runtime Pages	1–12
Table 2–1.	Installing the MMS Server Application	2–2
Table 2–2.	Installing the MMS Client Application	2–7
Table 3–1.	VPI II/iVPI Connection Ports	3–1
Table 3–2.	Starting the MMS Server Application	3–3
Table 3–3.	Accessing the MMS Server Settings Tabs	3–4
Table 3–4.	MMS Server Settings Tab Descriptions	3–5
Table 3–5.	Accessing the MMS Server Help	3–6
Table 3–6.	Shutting Down the MMS Server	3–7
Table 4–1.	Starting the MMS Client Application	4–2
Table 4–2.	MMS Client User Interface Details	4–3
Table 4–3.	Location Panel, Default Status Color Indications	4–4
Table 4–4.	Configuring MMS Servers	4–6
Table 4–5.	Setting MMS Client Color/Sound Options	4–9
Table 4–6.	Using the Task Scheduler	4–12
Table 4–7.	Accessing the MMS Client Help	4–17
Table 4–8.	Security Levels and Functions	4–18
Table 4–9.	Shutting Down the MMS Client	4–19
Table 5–1.	MMS Editor User Interface Descriptions	5–2
Table 5–2.	Modifying MMS Editor User Preferences	5–3
Table 5–3.	General Tab Preferences	5–4
Table 5–4.	Colors Tab Sub-tabs	5–5
Table 5–5.	Creating a New MMS Project	5–6
Table 5–6.	Building the Location Model	5–10
Table 5–7.	Importing CAAPE Data	5–13
Table 5–8.	CAAPE Project Data Imported by the MMS Editor When .CPB is Used	5–17
Table 5–9.	Linking VPI Variables to Symbol Parameters	5–18
Table 5–10.	Adding MMS Data to the Build File	5–20
Table 5–11.	Creating a Summary Report	5–23

LIST OF TABLES

Table No.	Title	Page
Table 5–12.	Printing a Layout Drawing	5–24
Table 6–1.	Starting the MMS Client Runtime Application	6–2
Table 6–2.	MMS Main Screen Detail	6–4
Table 6–3.	Main Screen Settings Tabs	6–9
Table 6–4.	Main Screen Help Menu	6–10
Table 6–5.	Main Screen Control System Status Indications	6–11
Table 6–6.	Main Screen Tools Descriptions	6–12
Table 6–7.	Maintenance Diagnostics Screen Interface	6–14
Table 6–8.	Application Explorer Screen Interface	6–16
Table 6–9.	Watch Window Options Menu Descriptions	6–19
Table 6–10.	Application Explorer Screen Settings Tabs	6–21
Table 6–11.	Log Manager Screen Interface	6–24
Table 6–12.	Configuration Manager Screen Interface	6–26
Table 7–1.	Overlay Track Symbol Attributes	7–1
Table 7–2.	Overlay Track Symbol Parameters – Indications	7–2
Table 7–3.	Non-Coded Track Symbol Attributes	7–3
Table 7–4.	Non-Coded Track Symbol Parameters – Controls	7–4
Table 7–5.	Non-Coded Track Symbol Parameters – Indications	7–5
Table 7–6.	Coded Track Symbol Attributes	7–6
Table 7–7.	Coded Track Symbol Parameters – Controls	7–8
Table 7–8.	Coded Track Symbol Parameters – Indications	7–8
Table 7–9.	Switch Symbol Attributes	7–9
Table 7–10.	Switch Symbol Parameters – Controls	7–11
Table 7–11.	Switch Symbol Parameters – Indications	7–11
Table 7–12.	Color Light Symbol Attributes	7–12
Table 7–13.	Color Light Symbol Parameters – Controls	7–14
Table 7–14.	Color Light Symbol Parameters – Indications	7–14
Table 7–15.	Position Light Symbol Attributes	7–15
Table 7–16.	Position Light Symbol Parameters – Controls	7–17
Table 7–17.	Position Light Symbol Parameters – Indications	7–17
Table 7–18.	Search Light Symbol Attributes	7–18
Table 7–19.	Search Light Symbol Parameters – Controls	7–20
Table 7–20.	Search Light Symbol Parameters – Indications	7–20
Table 7–21.	Semaphore Light Symbol Attributes	7–21
Table 7–22.	Semaphore Light Symbol Parameters – Controls	7–22
Table 7–23.	Semaphore Light Symbol Parameters – Indications	7–22
Table 7–24.	Alternate Track Symbol Attributes	7–23
Table 7–25.	Alternate Track Symbol Parameters – Indications	7–23

LIST OF TABLES

Table No.	Title	Page
Table 7–26.	Grade Crossing Symbol Attributes	7–24
Table 7–27.	Grade Crossing Symbol Parameters – Indications	7–25
Table 7–28.	Remote/Local Control Symbol Attributes	7–26
Table 7–29.	Remote/Local Control Symbol Parameters – Controls	7–26
Table 7–30.	Remote/Local Control Symbol Parameters – Indications	7–26
Table 7–31.	Timer Symbol Attributes	7–27
Table 7–32.	Timer Symbol Parameters – Indications	7–27
Table 7–33.	Generic Symbol Attributes	7–28
Table 7–34.	Generic Symbol Parameters – Controls	7–29
Table 7–35.	Generic Symbol Parameters – Indications	7–29
Table 7–36.	Direction Indicator Symbol Attributes	7–30
Table 7–37.	Direction Indicator Symbol Parameters – Indications	7–30
Table 7–38.	Alarm Symbol User-Defined Attributes	7–31
Table 7–39.	Text Box Symbol Attributes	7–32
Table 7–40.	Text Box Symbol Parameters – Indications	7–32

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SECTION 1 – GENERAL DESCRIPTION

1.1 SCOPE OF MANUAL

This manual provides the necessary information to properly operate and maintain the Client/Server version (v4.1.x) of the Maintenance Management System (MMS) for Alstom Vital Processor Interlocking Systems (VPI® II/iVPI).

1.2 OVERVIEW

This section briefly describes the components and physical characteristics of the Maintenance Management System (MMS).

> Note: The individual who installs MMS software must have administrator rights to the PC or laptop intended for use.

1.3 MAINTENANCE MANAGEMENT SYSTEM

Maintenance Management System (MMS) is a graphical Diagnostic and Maintenance Application that uses a graphical Track Layout to dynamically record and display the VPI diagnostic status along with the status of linked VPI variables.

Additional tools are available to manage diagnostics, view configuration information, view event and data logs, schedule maintenance tasks and view recorded VPI application variable data.

MMS consists of three applications:

- MMS Editor is used to graphically create the MMS Project
- MMS Server communicates with VPI systems and handles requests from MMS Clients
- MMS Client connects to MMS Servers, displays overall server status, and graphically displays runtime information for individual servers

1.4 REQUIREMENTS/FEATURES

Table 1–1. Minimum PC Requirements

Component	Requirement
Operating System	Windows™ XP (SP2 & SP3), Windows™ Vista, Windows™ 7, Windows™ Server 2008 (32-bit Operating Systems only)
RAM	2 GB
CPU	Intel II GHz Pentium or compatible
Hard Drive	100 GB available
Input Device	One of: Touch screen, Mouse, Trackball, Joystick and a Keyboard
Display	SVGA (1024 x 768)
Ports	One network connection (two required for redundancy)
Other	CD-ROM drive

Table 1–2. Control System Component Requirements

Component	Requirement
VPI Application	Must be created using VPI II® /iVPI application built with CAAPE version 12C or later
CSEX4 Board* or	CSEX4 used in VPI® II Systems
NVSP Board	NVSP Board used in iVPI Systems

* Does not support CSE or CSEX1 boards.

1.5 PRODUCT PART NUMBERS

Table 1–3. Commercialized Product Part Numbers

Part Number	Commodity	Type	Description
51795-081-00	Software	XP, Win7-32	VPI MMS Server/Editor, Maintenance Management System (Current Released Version is 4.1.x)
51795-082-00	Software	XP, Win7-32	VPI MMS Client, Maintenance Management System (Current Released Version is 4.1.x)

1.6 DOCUMENT CONVENTIONS

The conventions in Table 1-4 are used in this manual.

Table 1-4. Document Conventions

Convention	Description
bold	In command lines, bold text represents information that should be entered exactly as shown (keywords).
bold italic	Bold italic text is used to indicate icons to activate or selections in the menu tree.
italic	Italic text is used to indicate a file name
[ ]	In command lines, square brackets indicate an option. To enter the option, type only the information inside the brackets. Do not type the brackets themselves.
|	When describing a menu selection, this character is used to separate consecutive menu item choices. For example, File | Exit means to open the File dropdown menu and select the Exit item.

1.7 GLOSSARY OF TERMS

Table 1–5. Glossary of Terms

Term	Definition
Application Explorer	Accesses the selected System's variable data obtained through the diagnostic ports. Multiple logic, message, or I/O variables can be viewed in near real time. Variables are displayed using their assigned names and their current Boolean or integer values. Application logic statements can be displayed including the current values of the variables used to generate the statements. Datalogged variable data can be displayed using the playback feature.
CAAPE	Alstom's Computer-Aided Application Programming Environment software package converts Boolean expressions into operating instructions for the VPI microprocessor to generate interlocking logic configured to meet the needs of the particular installation.
CIL	Central Instrument Location
Communication Explorer	Provides access to serial ports through VT100. Display network statistics for networked connections.
Configuration Manager	Reports the expected and actual configuration items for each Application of the selected System. Both hardware and firmware items can be reported.
Control System	Hardware device connected to MMS computer. Currently only VPI® II/iVPI systems are supported.
Control Variable	Data received by the VPI® II/iVPI system
CPU II	Central Processing Unit II board used in the VPI® II Vital processor.
CPU/PD	Central Processing Unit/Polynomial Divider board used in the VPI® Vital processor.
CSEX	A family of non-vital communications and I/O control boards, including CSEX3 and CSEX4 used in VPI ® II systems.
Data Log	MMS events, System status, Diagnostics and VPI Data Logs saved in the MMS database.
Drawing Area	The Layout area of the MMS Editor where the location model is created. This is where symbols are placed and connected.
EULA	End-user license agreement

Table 1–5. Glossary of Terms (Cont.)

Term	Definition
HHT	Hand Held Terminal; a simple text-based diagnostic display device.
Import Wizard	A set of dialogs that guide a user through the steps necessary to place VPI information into the MMS Project database.
Indication Variable	Data received by the VPI® II/iVPI system
iVPI	Integrated Vital Processor Interlocking, an Alstom Vital wayside control system.
LCS file	The compiler's report file for a non-vital application (.lcs).
Log Manager	Handles the retrieval of VPI® II/iVPI data logs and the archival and display of all log data.
LVC file	The compiler's report file for a Vital processor application (.lvc).
MAC port	Maintenance ACcess Port; a port used to access diagnostic data.
MMS	Maintenance Management System.
MMS Client	MMS Client consists of two applications. MMS Client Main connects to MMS Servers,displays overall server status; and allows the user to open MMS Client Runtime for an individual server.
MMS Client Runtime	An application that graphically displays runtime information for an individual server location.
MMS Editor	An application used to create MMS Project databases.
MMS Event Log	VPI® II/iVPI control and indication data is recorded as MMS Event Log data.
MMS Server	An application that communicates with VPI systems and handles requests from MMS Clients
Maintenance Diagnostics	Graphical display of control system hardware status and diagnostic data.
Non-Vital Processor Board	A board responsible for the VPI® II/iVPI system non-vital processing: CSEX4, NVSP.
NVSP	Non-Vital System Processor non-vital communications and I/O control board used in iVPI systems.
NX	An eNtrance/eXit method of requesting a route through an interlocking
Session	The period of time MMS is operational; a new session log is created each time MMS is started.

Table 1–5. Glossary of Terms (Cont.)

Term	Definition
Status Bar	MMS information is displayed as an expandable text list; the last 50 items are displayed with their associated time stamps.
Symbol	A graphical object that represents a field device.
Task Scheduler	A basic calendar to do list allowing a user to control maintenance tasks.
Track Layout	The graphical model of a location.
VDP	Vital Diagnostic Protocol; a means of routing Vital processor diagnostic data through the diagnostic screens of a non-vital processor board.
Vital Processor Board	A board responsible for the VPI system non-vital processing: CPU/PD, CPU II, VSP
VPI® II	Vital Processor Interlocking II, an Alstom Vital wayside control system.
VPI Data Log	A collection of data retrieved from VPI® II CSEX Data Logger; the VPI® II CSEX Data Logger must be enabled and the data retrieved (see Section 6.3.4 Log Manager).
VSP	Vital System Processor board (used in iVPI systems).

1.8 CONTROL SYSTEM

MMS supports the following control systems:

- VPI® II
- iVPI

The control system is generally comprised of:

- One Vital processor board that coordinates the Vital aspects of system operation
- Up to four non-vital processor boards. A non-vital processor board coordinates non-vital communications and handles non-vital I/O. Non-vital only control systems containing only non-vital processor boards are also feasible.

1.8.1 VPI® II/iVPI Application

Various VPI® II/iVPI boards contain user programming that is specifically developed for the location where the system is installed. The programming for a particular board is called an application. Each application includes logic statements that control the board's behavior. Logic statements manipulate variables, which are memory locations containing some discrete piece of information such as the status of an I/O port or a message bit. The most common logic statement is the Boolean equation, which logically combines the values of several variables to get a single True or False value and then assigns that value to one or more results. Vital processor boards are capable of processing only Boolean equations. Non-vital processor boards are also capable of processing integer equations as well as more complex statements such as subroutines and IF/ELSE.

The application programming for a board is produced by compiling graphical or text based input files using software tools contained in the Computer-Aided Application Programming Environment (CAAPE). The compile process of the CAAPE optionally produces a report file which includes, among other things, a symbol table mapping memory locations to variable names and a logic section listing the logic statements in the application. Report files for Vital processor applications have an "LVC" extension; report files for non-vital processor applications have an "LCS" extension.

1.8.2 VPI Communication Ports

Boards in the non-vital processor family produce diagnostic data that can be accessed through the MAC serial port by a series of menu-driven screens which can be displayed on a VT100 video terminal or an equivalent terminal emulator program.

> Note: The Client/Server version (v4.1.x) of MMS currently does not support MAC serial port connection to non-vital boards. Use AlsDload, or an equivalent terminal emulator program, to make such connections.

These boards can also produce real-time variable status data in a format compatible with MMS but is not directly displayable on a video terminal. MMS can also use a network diagnostic port for Data Log retrieval.

The Vital processor board provides diagnostic information in a text-based query/response format that was originally meant for viewing with a hand held terminal. Newer versions of VPI® II/iVPI system software also have a Vital Diagnostic Protocol (VDP) option that can route diagnostic information from the Vital processor board through either a serial port, or through dual-ported random access memory (RAM) to the non-vital processor board and displayed through the non-vital processor board's diagnostic screens.

1.9 MMS EDITOR

Use the MMS Editor to:

- Graphically model a given location
- Gather VPI application information
- Link symbol parameters to VPI variables for each graphical element
- Create an MMS Project database for use by MMS Client Runtime
- Add alarms and sounds
- Add security settings
- Remove the color setting from generic symbols

The model of the plant is entered through the user-friendly Track Layout environment, using symbols representing track circuits, switches, signals, timers, and other layout hardware.

The Import Wizard function guides the user to easily enter VPI configuration data into the MMS Project database. Individual Symbol parameters can be linked to VPI variables by the “drag and drop” of VPI variable names into the parameter tables.

See SECTION 5 – MMS Editor for a detailed explanation of how to use the MMS Editor to create an MMS Project.

1.9.1 MMS Projects

MMS Projects provides a variety of standard features:

- Iconic representation of Control System status
- Symbol parameter states graphically displayed and recorded
- Board level diagnostics w/ solution guidelines
- VPI® II/iVPI Vital and non-vital variable states displayed; can be recorded [up to 128 Vital variables per Application (see Table 1–6); up to 128 non-vital variables per Application]
- VPI® II/iVPI Application logic display
- VPI® II/iVPI Data log retrieval; view Data logs and recorded data; Log reports
- VPI® II/iVPI Configuration reports
- To Do list for task scheduling

Additional features are available for newer VPI® II/iVPI and CAAPE software versions, as summarized in Table 1–6.

Table 1–6. MMS Projects Features Available with Specific VPI® II/iVPI and/or CAAPE Software

Feature	Requirement
View up to 128 Vital variable states at one time in Application Explorer	VPI® II (CPU II) and iVPI (VSP) using Ethernet and CAAPE version 8 or later and MMS version 3.0 or later
View up to 128 non-vital variable states at one time in Application Explorer	iVPI (NVSP) using Ethernet and CAAPE version 8 or later and MMS version 3.0 or later

1.10 MMS SERVER

MMS Server is an application that communicates with VPI systems and handles requests from MMS Clients.

MMS Servers reside on a network to allow communication to MMS Clients using Windows Communication Foundation over TCP/IP.

MMS Server uses the data provided in an MMS Project database created with MMS Editor. This database contains data describing the plant model and connected Control Systems. MMS Server continuously displays the health of each connected control system. If a problem is identified, diagnostic information is requested and logged.

Control Systems are connected through Ethernet ports to the MMS server computer, allowing data to be stored and transferred to MMS clients. Controls and indications, control system health, application equation and variable data, configuration information, and data log information can be transferred.

The Control System information includes:

- physical hardware layout and identification
- type of system / application
- variable data
- equation logic data
- network connection type and settings

1.11 MMS CLIENT

MMS Client consists of two applications, MMS Client Main and MMS Client Runtime. MMS Client Main connects to MMS Servers, displays overall server status; and allows the user to open MMS Client Runtime for an individual server.

1.11.1 MMS Client Main

MMS Client Main allows the user to:

- View operational, communication & alarm status
- Set up server configuration data
- Set colors for status and assign sounds to alarms
- Allows user to open MMS Client Runtime

1.11.2 MMS Client Runtime

MMS Client Runtime:

- Uses a graphical point and click interface, eliminating the need to know command sets for each protocol. Displayed graphical symbols change state based on the linked control system variable data.
- Continuously displays the health of each connected control system.
- Displays information on designated pages (see Table 1–7)

Table 1–7. MMS Client Runtime Pages

Page	Description
Maintenance Diagnostic	Displays recorded board level diagnostic information along with troubleshooting and suggested solutions. Diagnostics can be filtered, cleared and history viewed. See Section 6.3.2.
Application Explorer	Displays variable states and equation logic for tracing possible problems. Variable state data can be recorded to play later. Data played later, variable state as well as VPI CSEX log data, is displayed in a timing diagram format. See Section 6.3.3.
Log Manager	Retrieves VPI® II/iVPI CSEX data logs. These logs can be manually or automatically retrieved as a timed task. Creates reports of MMS events or data logs. See Section 6.3.4.
Configuration Manager	Displays control system hardware and firmware configuration information. See Section 6.3.5.
Communication Explorer	Displays network statistics. See Section 6.3.6

SECTION 2 – INSTALLATION

2.1 OVERVIEW

This section describes how to install MMS Server/Editor and MMS Client on separate workstations or on the same workstation.

A typical installation of the MMS Server and Client applications consists of:

- Installing the MMS Server application in Central Control
- Installing the MMS Client application on the VPI workstation in the Central Instrument Location (CIL)

Both applications (MMS Server and Client) can be installed together on the VPI workstation in the CIL. See Figure 2–1.

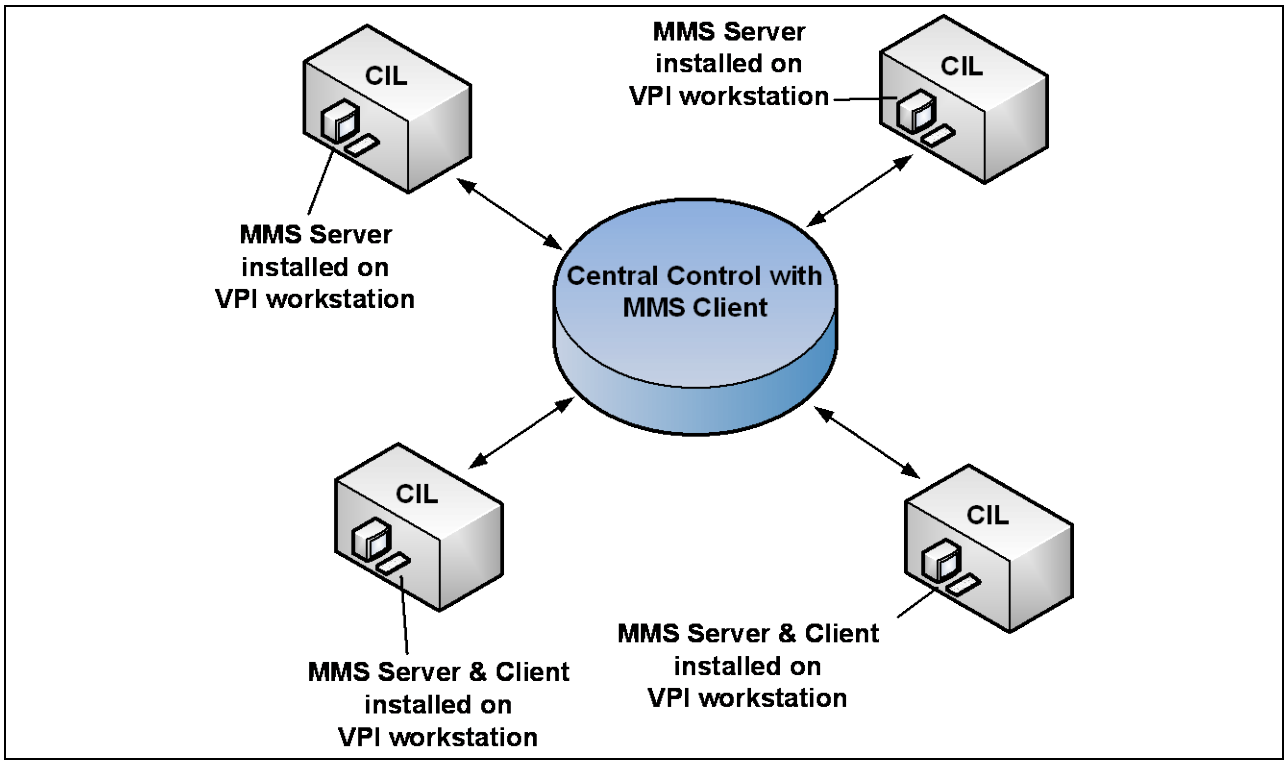


Figure 2–1. MMS Server/Client Installation Overview

2.2 MMS SERVER INSTALLATION

Install the MMS Server application at the location site where the VPI system is located.

Note: The MMS Editor application is installed when the MMS Server application is installed.

To install the MMS Server application, follow the steps in Table 2–1.

Table 2–1. Installing the MMS Server Application

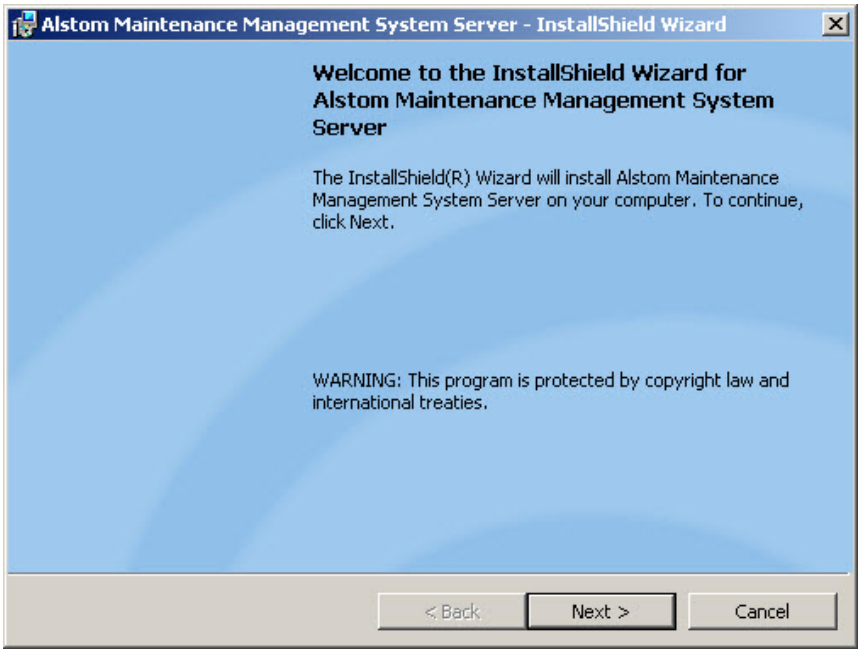
Step	Action
1	Insert the MMS Server installation CD-ROM (P/N 51795-082-00) into the CD-ROM drive.
2	To start the installation process: • Browse to the CD-ROM drive and double-click the ***Setup.exe*** file, or • Select ***Start*** from the Taskbar and ***Run*** from the Menu bar; enter ***x:\Setup.exe*** where ***x*** is the CD-ROM drive letter. Note: If installing MMS on a Windows 7 system. Right-click on the ***Setup.exe*** file and select ***Run as Administrator***.
3	The InstallShield Wizard Welcome screen opens.  Click ***Next***.

Table 2–1. Installing the MMS Server Application (Cont.)

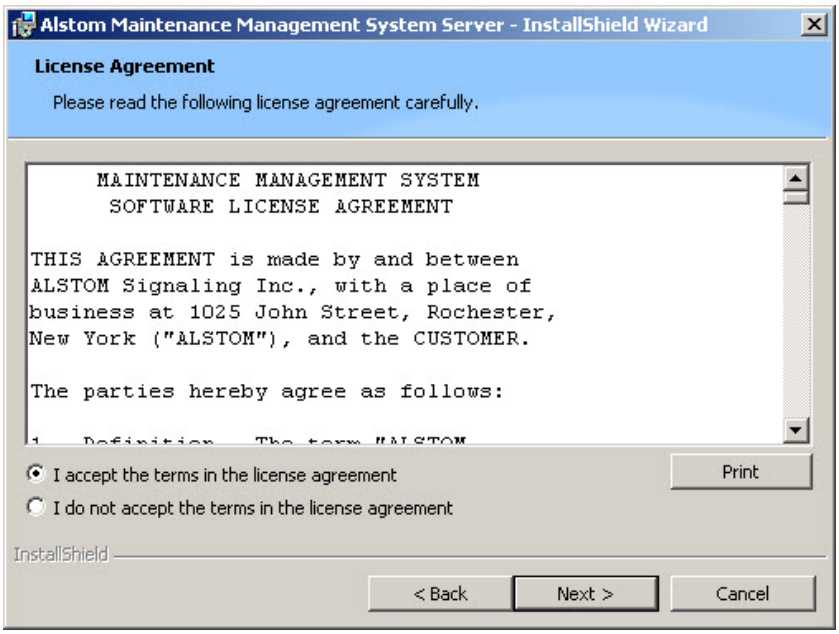
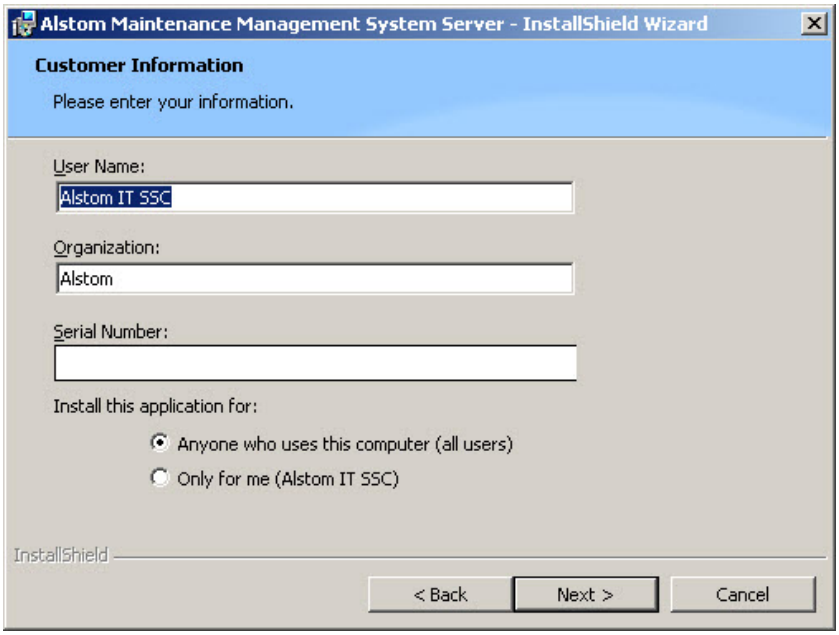
Step	Action
4	The License Agreement Screen opens.  Select ***I accept the terms in the license agreement***. Click ***Next***.
5	The Customer Information screen opens. 

Table 2–1. Installing the MMS Server Application (Cont.)

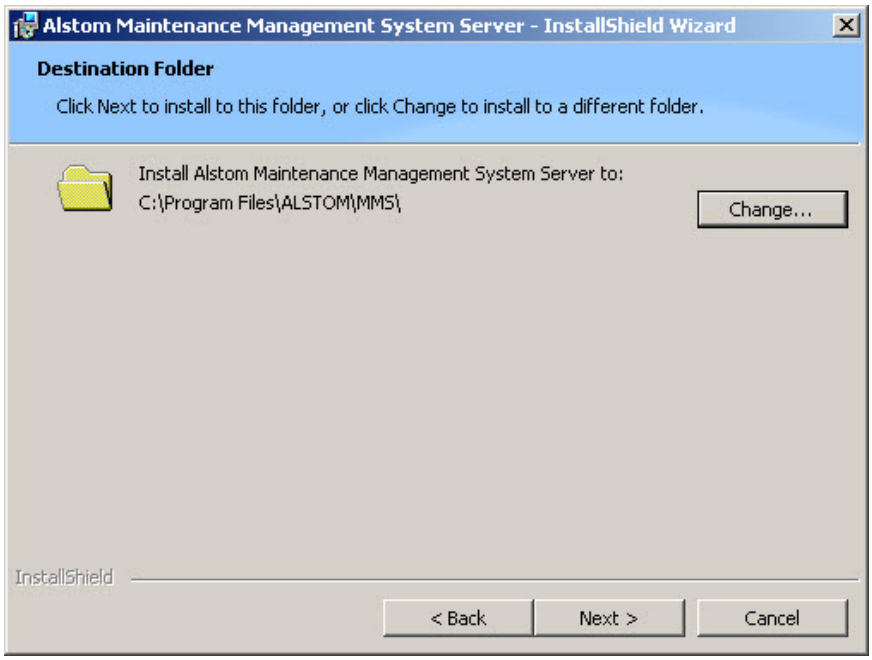
Step	Action
5	(Step 5 cont.) Complete the fields as follows: • **User Name:** Enter a user name. • **Organization:** Enter the name of the organization using MMS. • **Serial Number:** Enter the supplied MMS serial number. • Select who can access the MMS Server application (all users or only the user specified in **User Name** field). Click ***Next***.
6	The Destination Folder screen opens.  • To change the default location where the MMS Server application is installed, click ***Change*** and navigate to the desired location. • To install the MMS Server application in the default location, click ***Next***.

Table 2–1. Installing the MMS Server Application (Cont.)

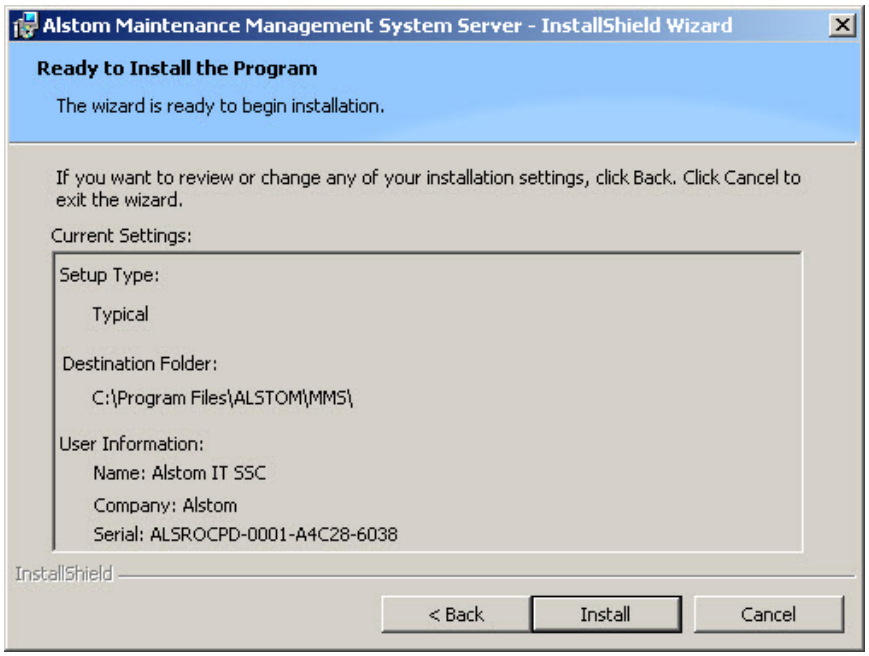
Step	Action
7	The Ready to Install screen opens.  Review the installation settings. • To change any settings, click ***Back*** and make the necessary changes. • To install the MMS Server application, click ***Install***.

Table 2–1. Installing the MMS Server Application (Cont.)

Step	Action
8	When the installation is done, the InstallShield Wizard Completed screen opens. Click ***Finish***. The MMS Server application is now installed. See SECTION 3 – MMS Server for startup/shutdown and configuration instructions.
9	Repeat this procedure to install the MMS Server application at other VPI system locations, or proceed to the MMS Client application installation (see Section 2.3).

2.3 MMS CLIENT INSTALLATION

Install the MMS Client application on the designated workstation at Central Control.

Note: The MMS Client application can also be installed on the VPI workstation in the CIL with the MMS Server Client.

Note: The MMS Client Runtime application is installed when the MMS Client application is installed.

To install the MMS Client application, follow the steps in Table 2–2.

Table 2–2. Installing the MMS Client Application

Step	Action
1	Insert the MMS Server installation CD-ROM (P/N 51795-082-01) into the CD-ROM drive.
2	To start the installation process: • Browse to the CD-ROM drive and double-click the Setup.exe file, or • Select ***Start*** from the Taskbar and ***Run*** from the Menu bar; enter ***x:\Setup.exe*** where ***x*** is the CD-ROM drive letter. Note: If installing MMS on a Windows 7 system, right-click on the ***Setup.exe*** file and select ***Run as Administrator***.

Table 2–2. Installing the MMS Client Application (Cont.)

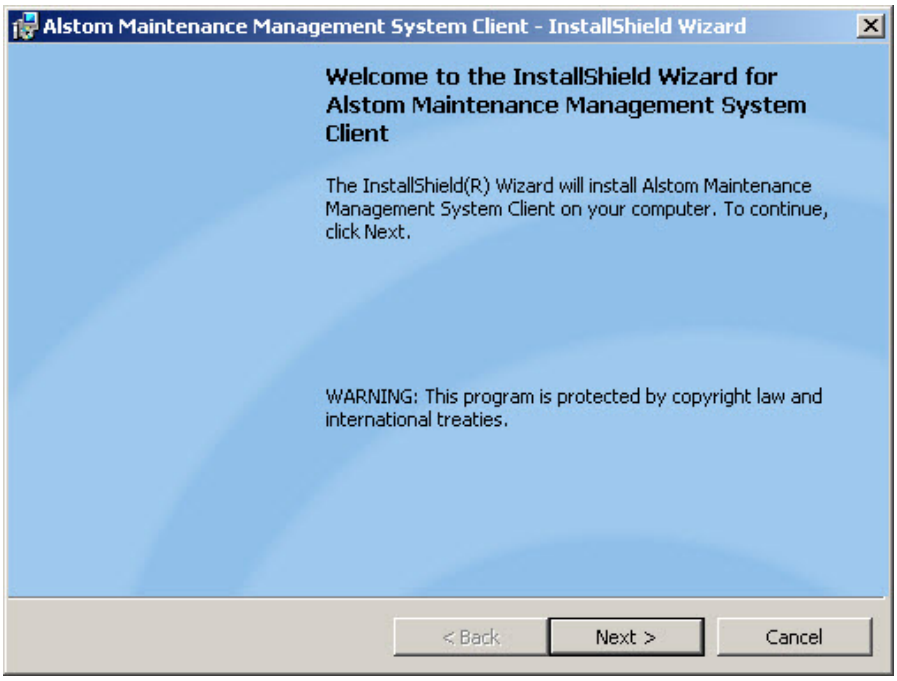
Step	Action
3	The InstallShield Wizard Welcome screen opens.  Click ***Next***.

Table 2–2. Installing the MMS Client Application (Cont.)

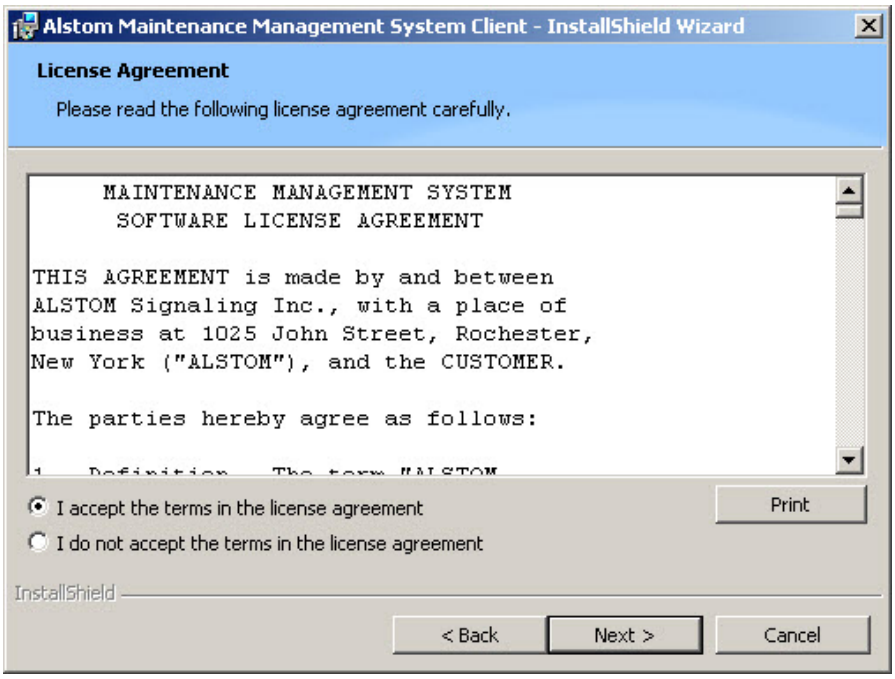
Step	Action
4	The License Agreement Screen opens.  Select ***I accept the terms in the license agreement.*** Click ***Next***.

Table 2–2. Installing the MMS Client Application (Cont.)

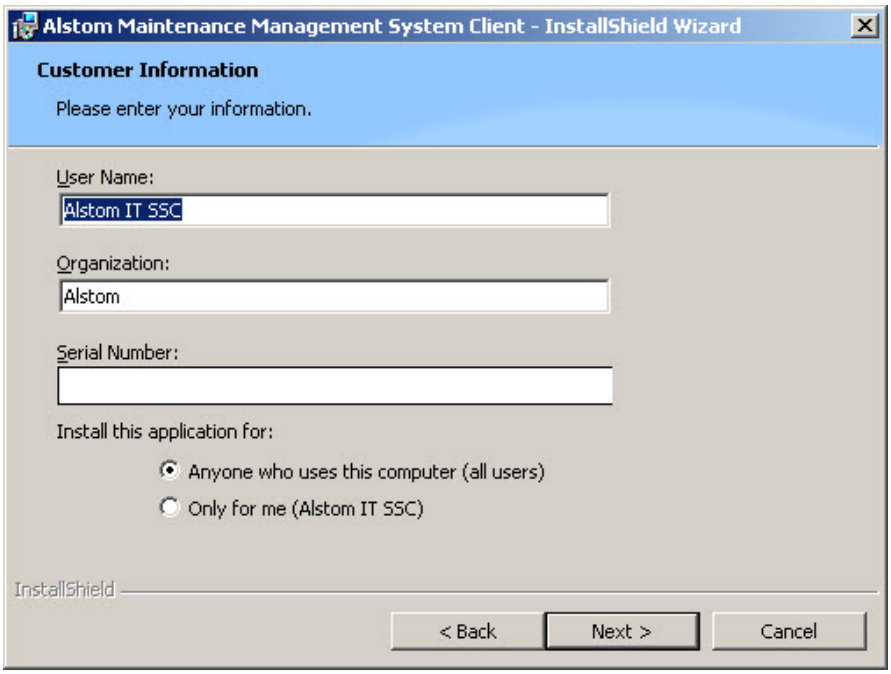
Step	Action
5	The Customer Information screen opens.  Complete the fields as follows: • **User Name:** Enter a user name. • **Organization:** Enter the name of the organization using MMS. • **Serial Number:** Enter the supplied MMS serial number. • Select who can access the MMS Client application (all users or only the user specified in **User Name** field). Click ***Next***.

Table 2–2. Installing the MMS Client Application (Cont.)

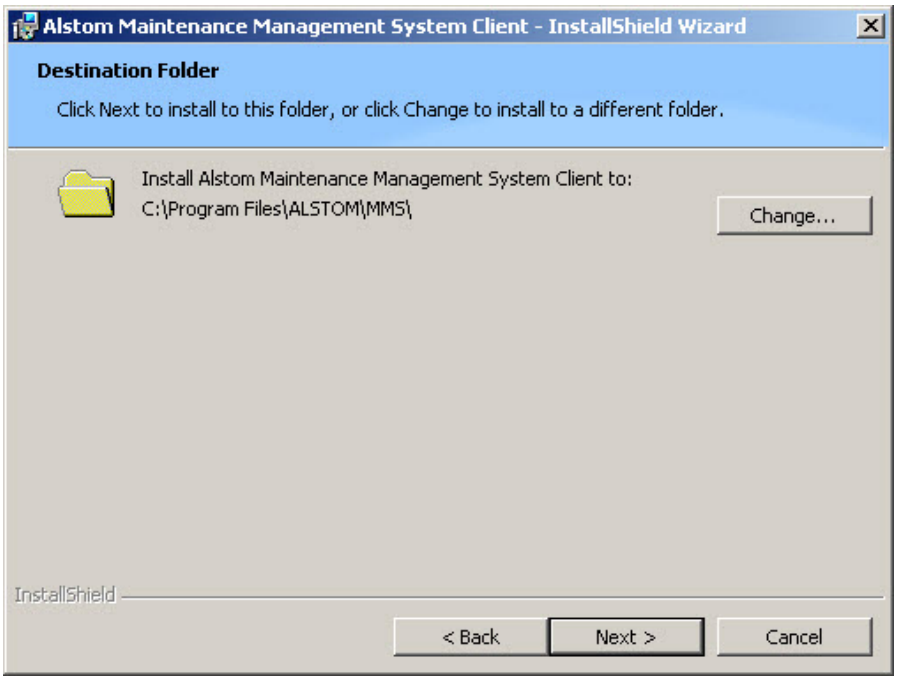
Step	Action
6	The Destination Folder screen opens.  • To change the default location where the MMS Client application is installed, click ***Change*** and navigate to the desired location. • To install the MMS Client application in the default location, click ***Next***.

Table 2–2. Installing the MMS Client Application (Cont.)

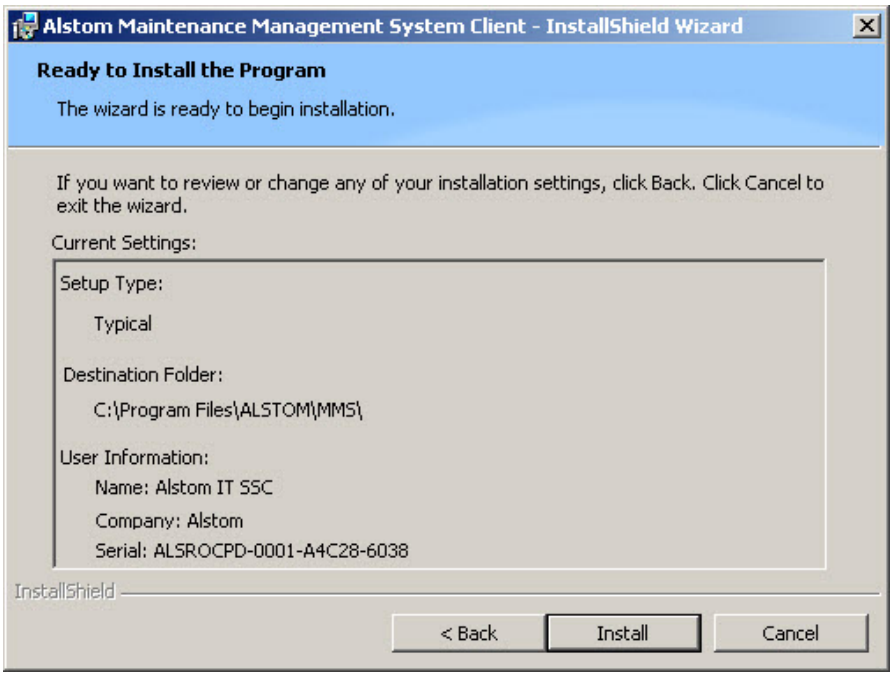
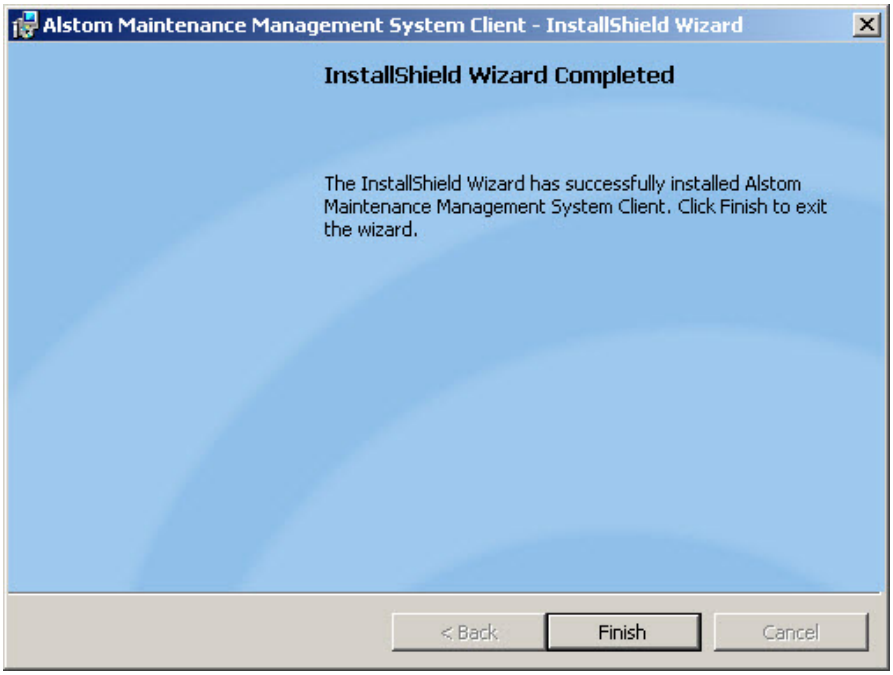
Step	Action
7	The Ready to Install screen opens.  Review the installation settings. • To change any settings, click ***Back*** and make the necessary changes. • To install the MMS Client application, click ***Install***.

Table 2–2. Installing the MMS Client Application (Cont.)

Step	Action
8	When the installation is done, the InstallShield Wizard Completed screen opens.  Click ***Finish***. The MMS Client application is now installed. See SECTION 4 – MMS Client Main for startup/shutdown and configuration instructions. If necessary, repeat this procedure to install the MMS Client application on a VPI system workstation where the MMS Server application is installed.

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SECTION 3 – MMS SERVER

3.1 OVERVIEW

This section explains how to:

- Start the MMS Server application (Section 3.2)
- Configure the MMS Server application (Section 3.4)
- Shut the MMS Server application down (Section 3.6)

As described in Section 2.2, the MMS Server application is typically installed on the VPI workstation located in the CIL.

3.2 CONNECT TO A VPI SYSTEM

MMS Server communicates with VPI processors via TCP/IP over Ethernet. IP addresses for the MMS computer and VPI processors are configured in CAAPE, and network ports are configured for connection to MMS in either the MMS Server **Options** screen, or MMS Editor **Additional MMS Data** screen.

Table 3–1 provides a list of port types and their applicable connections. Examples of various port connections are provided in Figure 3–1 and Figure 3–2.

Table 3–1. VPI II/iVPI Connection Ports

Port Type	Connection
CPU II	Preferred: CPU II network connections via Two 10/100-baseT Ethernet network controllers. CPU2 Main Processor diagnostic port.
CSEX4	Preferred: CSEX4 network connections via Two 10/100-baseT Ethernet network controllers.
VSP	Preferred: VSP (iVPI) network connections via Two 10/100-baseT Ethernet network controllers. VSP Main Processor diagnostic port.
NVSP	Preferred: NVSP (iVPI) connections via Two 10/100-baseT Ethernet network controllers.

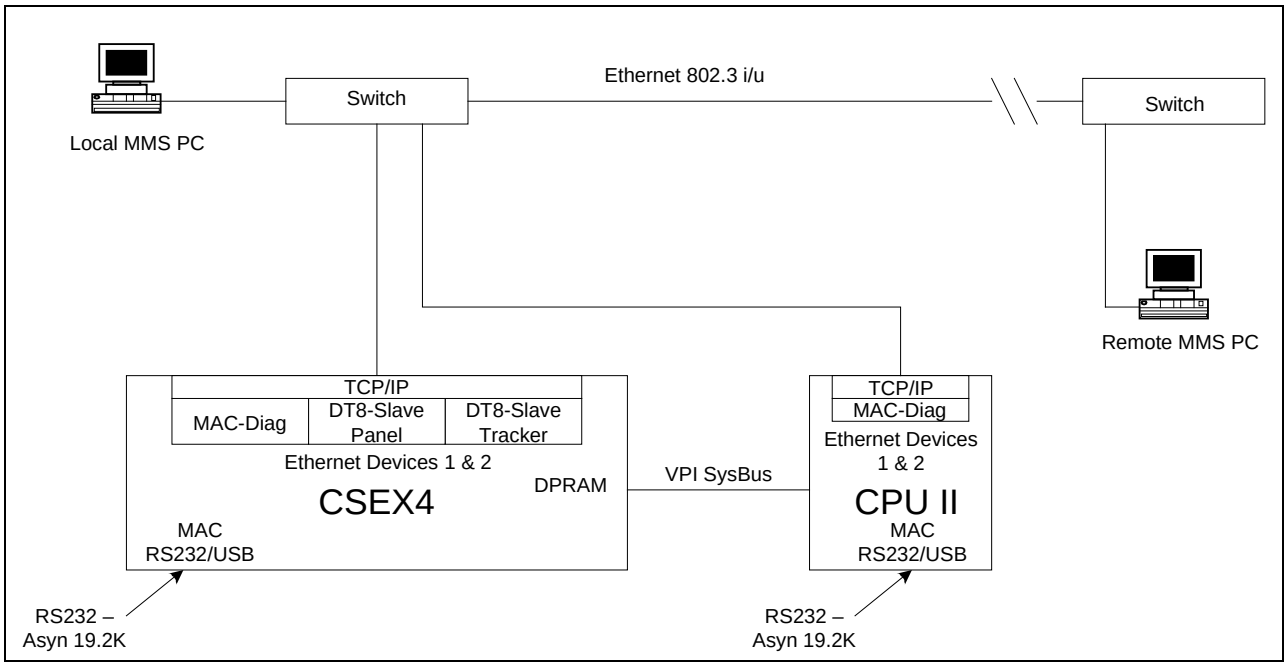


Figure 3–1. CPU II and CSEX4 Diagnostics

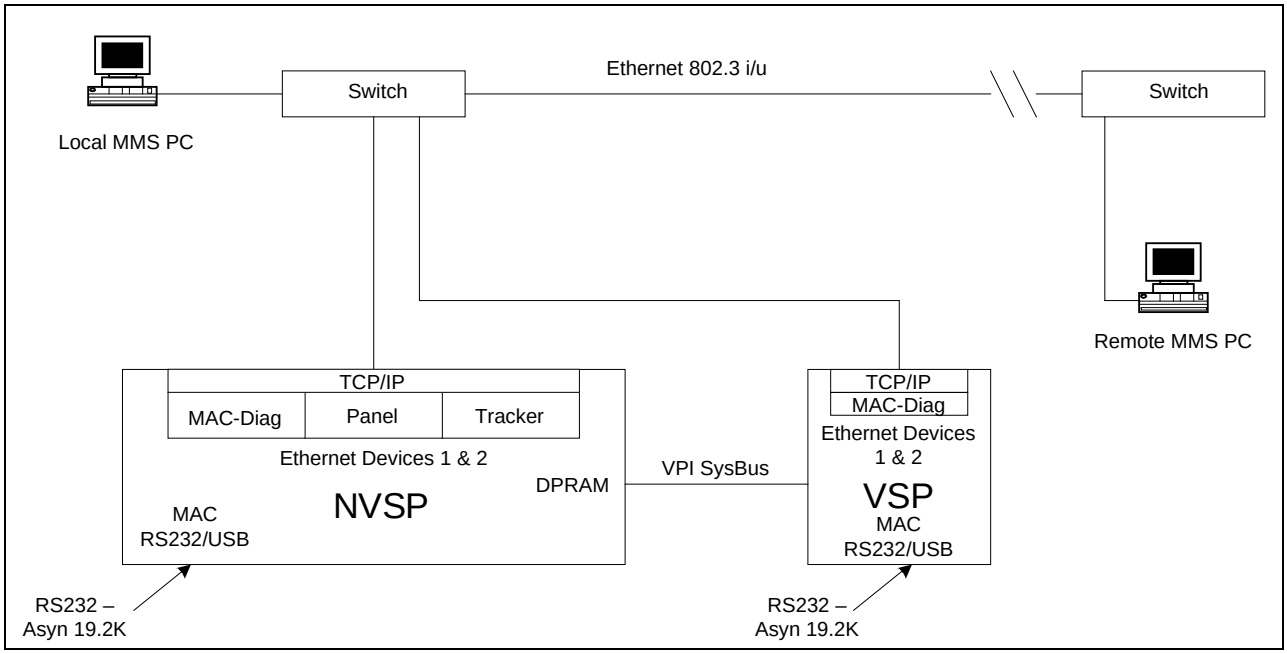


Figure 3–2. VSP and NVSP Diagnostics

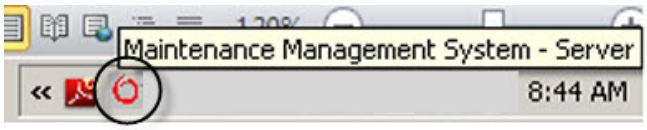
3.3 MMS SERVER START-UP

To start the MMS Server application, follow the procedure in Table 3–2.

Note: For Windows 7, if security is set to any level above ***No Security***, right-click on the ***MMSService.exe*** file and set its properties to ***Run as Administrator*.**

Note: Start the MMS Server Application first before starting the MMS Client application. If the MMS Client application is started before the MMS Server application, the two applications synchronize once the MMS Server application is started.

Table 3–2. Starting the MMS Server Application

Step	Action
1	To start the MMS Server application, select ***Start* | *Programs* | *Alstom* | *Maintenance Management System* | *Server* |*Server***. The MMS Server splash screen briefly appears.
2	Once the MMS Server application starts, an icon appears in the workstation's system icon tray.  Right-click on the icon to access the following options: • Options (see Section 3.4) • Help (see Section 3.5) • Shutdown (see Section 3.6)

3.4 MMS SERVER OPTIONS

The MMS Server application provides several settings tabs to configure server operation. To access the settings tabs, follow the procedure in Table 3–3.

Table 3–3. Accessing the MMS Server Settings Tabs

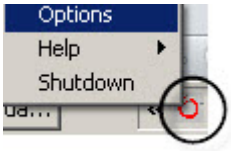
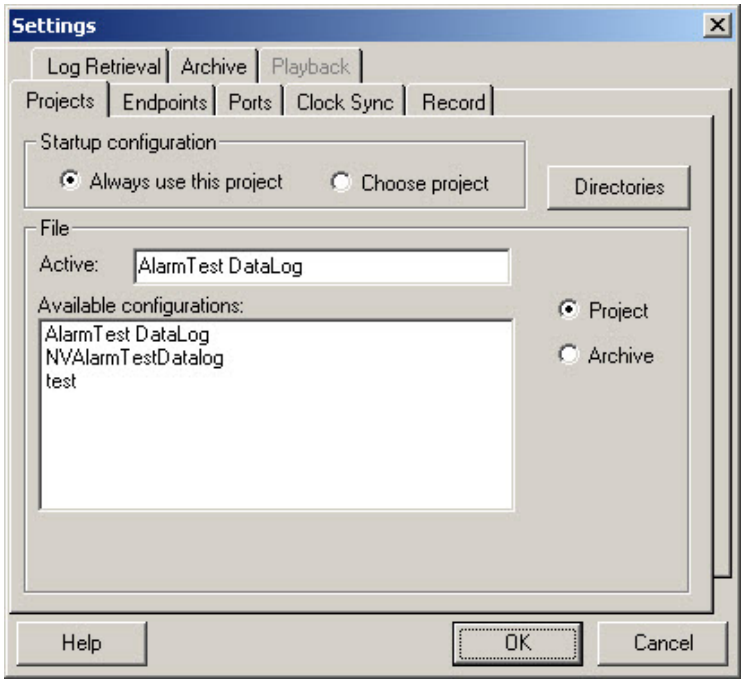
Step	Action
1	On the VPI system workstation with the MMS Server application installed, right-click on the MMS Server icon in the system tray. From the pop-up menu, select ***Options***. 
2	The Settings window opens.  Select the tab (or tabs) and make the necessary configurations. See Table 3–4 for descriptions of the MMS Server Settings tabs.
3	When all configuration settings are made, click ***OK*** to save the settings and close the Settings window.

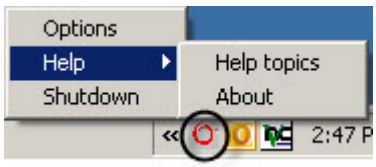
Table 3–4. MMS Server Settings Tab Descriptions

Tab	Description
Projects	Use this tab to choose a project on startup or select a project to load at MMS Server startup.
Endpoints	Use this tab to set endpoint connection IP addresses. Endpoints are the server IP addresses that are used to communicate with the remote client(s). For the Main IP and Backup IP, select ***<none>***, or enter a unique IP address in each field.
Ports	Use this tab to configure the VPI/MMS serial communication ports. The initial screen shows the active ports with buttons to ***Add***, ***Remove***, and ***Show Properties***. • **Add:** Click to add network and serial ports • **Remove:** Click to remove selected active ports • **Properties:** Click to modify a selected active port
Clock Sync	Use this tab to synchronize all VPI system clocks to the MMS clock. For this function to work, do not use the VPI password.
Record	Use this tab to set recording properties. Enable or disable the recording of panel events, status bar text, and data log retrieval text in the MMS log. System status and diagnostics are always recorded.
Log Retrieval	Use this tab to configure automatic data log retrieval. • **Automatic Log retrieval enabled:** Click this box to enable automatic retrieval of the data log. • **Interval:** Set the retrieval interval (days/hours). • **Next scheduled retrieval:** Schedule when the next retrieval will occur (date/time).
Archive	Use this tab to configure automatic archiving. • **Automatic Archive enabled:** Click this box to enable automatic archiving. • **Archive schedule:** Set the archiving interval (month/days) and schedule when the next archiving will occur (day/month/year).

3.5 MMS SERVER HELP

To access the embedded help file and About screen provided in the MMS Server application, follow the procedure in Table 3–5.

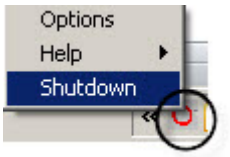
Table 3–5. Accessing the MMS Server Help

Step	Action
1	On the VPI system workstation with the MMS Server application installed, right-click on the MMS Server icon in the system tray. From the pop-up menu, select ***Help***.  There are two options under Help. Select the desired option. • **Help topics:** Select this option to open the MMS Server help file. The help file contains information on how to configure and operate the MMS Server application. • **About:** Select this option to open the MMS Server About screen. This screen shows the server release version, license code, and end-user license agreement (EULA).

3.6 MMM SERVER SHUTDOWN

To shutdown (exit) the MMS Server application, follow the procedure in Table 3–6.

Table 3–6. Shutting Down the MMS Server

Step	Action
1	On the VPI system workstation with the MMS Server application installed, right-click on the MMS Server icon in the system tray. From the pop-up menu, select ***Shutdown***.  The MMS Server application closes. The system tray icon disappears.

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SECTION 4 – MMS CLIENT MAIN

4.1 OVERVIEW

This section explains how to:

- Start the MMS Client Main application (Section 4.2)
- Use the MMS Client Main application (Section 4.3)
- Manage the security level settings (Section 4.4)
- Shut the MMS Client Main application down (Section 4.5)

As described in Section 2.3, the MMS Client application is typically installed on a designated workstation located in Central Control. The MMS Client application can also be installed on the VPI system workstation located in the CIL.

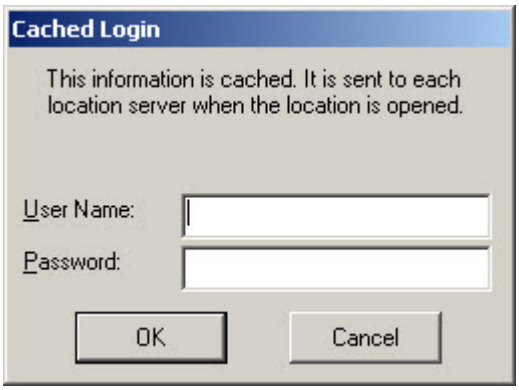
4.2 MMS CLIENT START-UP

To start the MMS Client application, follow the procedure in Table 4–1.

Note: For Windows 7, if security is set to any level above ***No Security***, right-click on the ***MMS_Client_Main.exe*** file and set its properties to ***Run as Administrator.***

Note: Start the MMS Server Application first before starting the MMS Client application. If the MMS Client application is started before the MMS Server application, the two applications synchronize once the MMS Server application is started.

Table 4–1. Starting the MMS Client Application

Step	Action
1	To start the MMS Client application, select ***Start* | *Programs* | *Alstom* | *Maintenance Management System* | *Client* | *Client.*** The MMS Client splash screen briefly appears.
2	The MMS Client Login window opens.  Click ***OK***. The MMS Client application opens. Note: Login is not necessary if only Level 1 (default) security is needed (see Section 4.4). If security access above Level 1 security is needed, enter a valid user name and password. MMS allows for three login attempts. After three failed attempts, the user is logged in with Level 1 security access. Note: The login is cached and is sent to each location server when the location is opened. Login is only needed once unless a higher security level is needed.

4.3 MMM CLIENT USER INTERFACE

4.3.1 Overview

The MMS Client application provides access to each installed MMS Server application on the network. The user interface consists of the following:

From the MMS Client application, the MMS user can:

- Configure servers and refresh server connections
- Assign color associations to the server statuses displayed (see Section 4.3.3.4)
- Assign a sound file to play when an alarm occurs (see Section 4.3.3.4)
- Set tasks in the Task Scheduler
- Open the MMS Client Runtime application for a specific MMS Server location

See Figure 4–1 and Table 4–2 for more information.

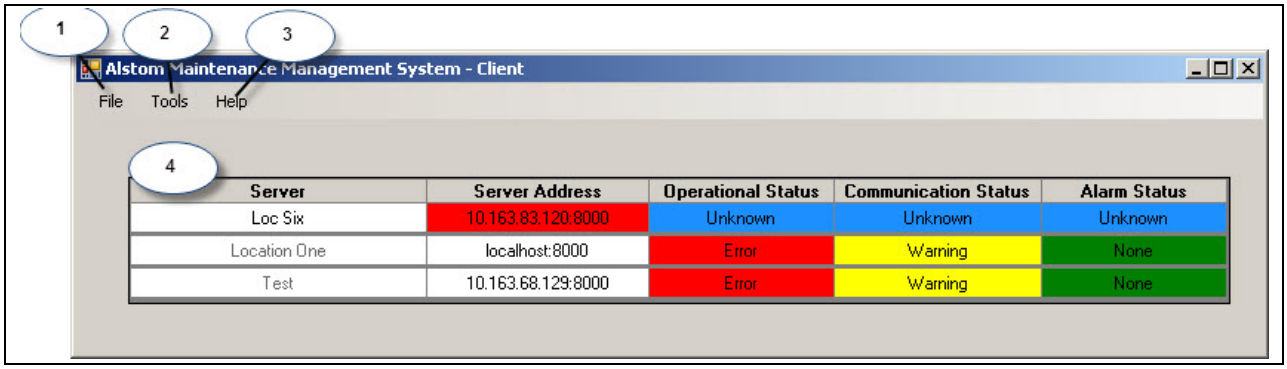


Figure 4–1. MMS Client User Interface

Table 4–2. MMS Client User Interface Details

Callout	Description
1	File Menu. Contains Exit function. See Section 4.5 for more information.
2	Tools Menu. Contains configuration options. See Section 4.3.2 for more information.
3	Help Menu. Contains the MMS online help file. See Section 4.3.4 for more information.
4	Locations Panel. Displays status for all MMS servers (locations) on the network. See Section 4.3.2 for more information.

4.3.2 Locations Panel

The Locations Panel:

- Displays status for all MMS Servers (locations) on the network
- Launches the MMS Client Runtime application for a selected MMS Server (location); see Section 6.3

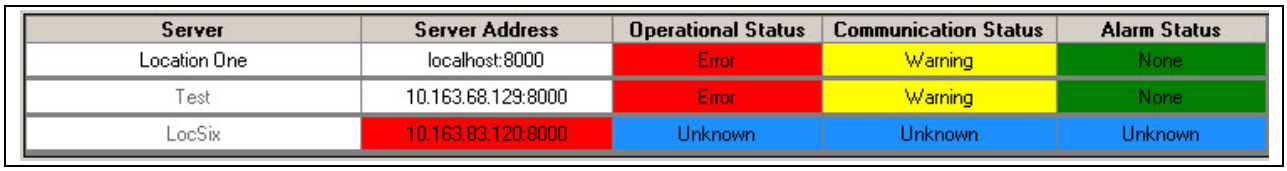


Figure 4–2. MMS Client, Locations Panel

The Locations Panel displays the following information for each MMS Server:

- Server Name (Server column)
- Server Address and connection status via color indication
- Status (Operational, Communication, and Alarm)

The Locations Panel uses text displays (Unknown, Nominal, Warning, and Error) and color indications to provide server status. See Table 4–3 for default color indications.

Table 4–3. Location Panel, Default Status Color Indications

Status Indication	Default Color
Unknown	Dodger Blue
Error	Red
Nominal	Green
Warning	Yellow
Connected	White
Disconnected	Red
None	Green
Acknowledged	Yellow
Active	Red

To change the default color indications, see Section 4.3.3.4.

4.3.3 Tools Menu

Use the Tools Menu to:

- Log in/out for security level access to MMS functions
- Add, remove, and configure MMS servers installed on the network
- Refresh server connections
- Assign color and sound associations for server status displays
- Access the Task Scheduler

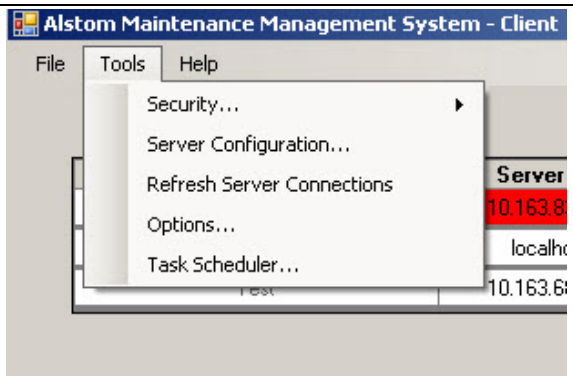


Figure 4–3. MMS Client, Tools Menu

4.3.3.1 Security

Select this option to log in for a higher access level than Security Level 1 (default) or the level logged in as when the MMS Client application was launched.

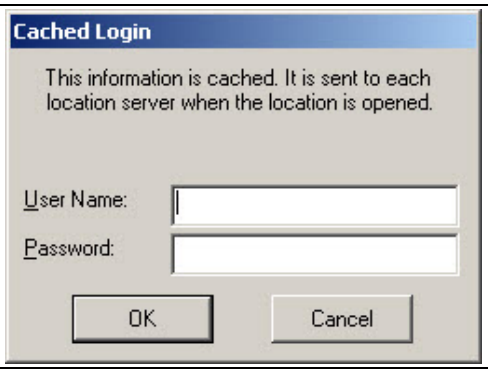


Figure 4–4. Cached Login Window

For more information on security levels, see Section 4.4.

4.3.3.2 Server Configuration

Select this option to add a new server, change the properties for an existing server, or remove an existing server. Follow the procedure in Table 4–4.

Table 4–4. Configuring MMS Servers

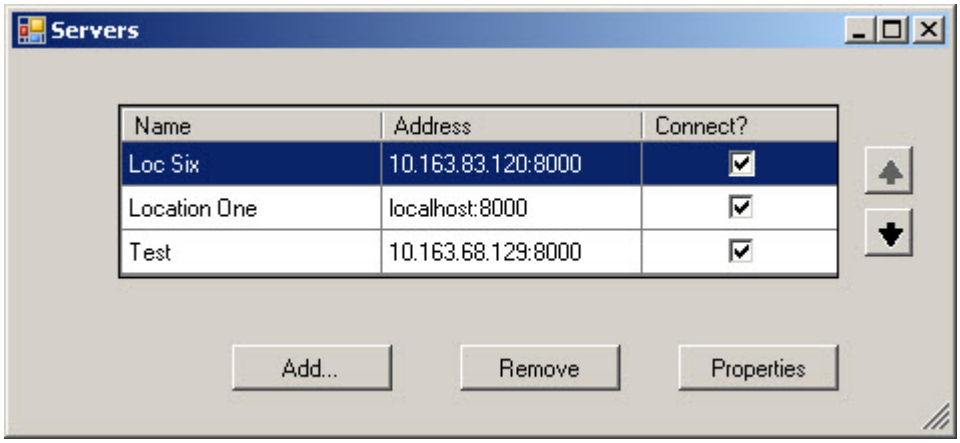
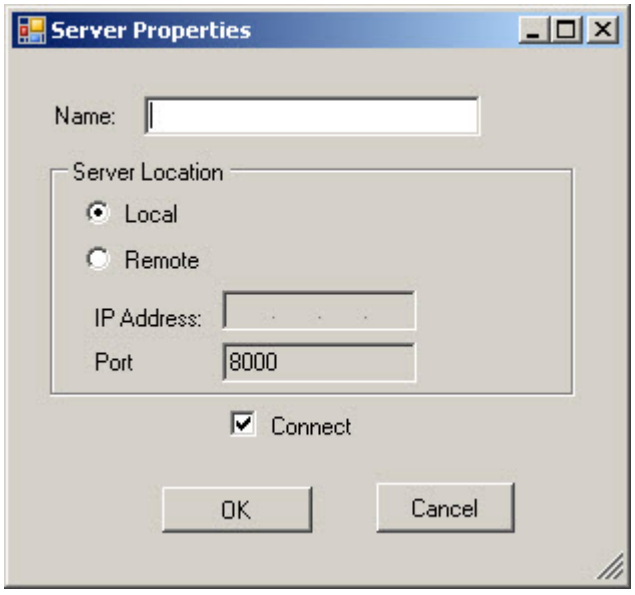
Step	Action
1	From the MMS Client user interface, select ***Tools | Server Configuration***. The Servers window opens. 
2	To add a new server, click the ***Add*** button. The Server Properties window opens. 

Table 4–4. Configuring MMS Servers (Cont.)

Step	Action
2	(Step 2 cont.) Configure the new server as follows: • **Name:** Enter a name for the new server. • **Local/Remote:** Select whether the server is a local server (installed with the MMS Client application) or remote. If MMS Server is on the same computer as MMS Client, select ***Local***. • **IP Address:** If the server is a remote server, enter a unique IP address. • **Port:** The port number is fixed at 8000. • **Connect:** Check this box to enable the server to automatically connect to the MMS Client application when the MMS Client application is started. When all settings are made, click **OK**. The Servers window returns.
3	To configure an existing server, select the desired server from the Servers window. Use the **Up/Down** arrows to scroll through the list of servers. Click the ***Properties*** button. The Server Properties window opens. Change the properties as needed. See Step 2 above for more information.
4	To remove a server, select the desired server from the Servers window. Use the **Up/Down** arrows to scroll through the list of servers. Click the ***Remove*** button. The server is removed from the list in the Servers window. Note: The server that was removed continues to show in the Location Panel on the MMS Client until the server connections are refreshed. See Section 4.3.3.3.

4.3.3.3 Refresh Server Connections

Select this option to refresh connections to all MMS Servers on the network. If any configuration changes were made (for example, a server was added or removed), the change appears in the MMS Client Location Panel after server connections are refreshed.

As server connections are refreshed, the Location Panel goes blank (see Figure 4–5), then returns with updated connection status.

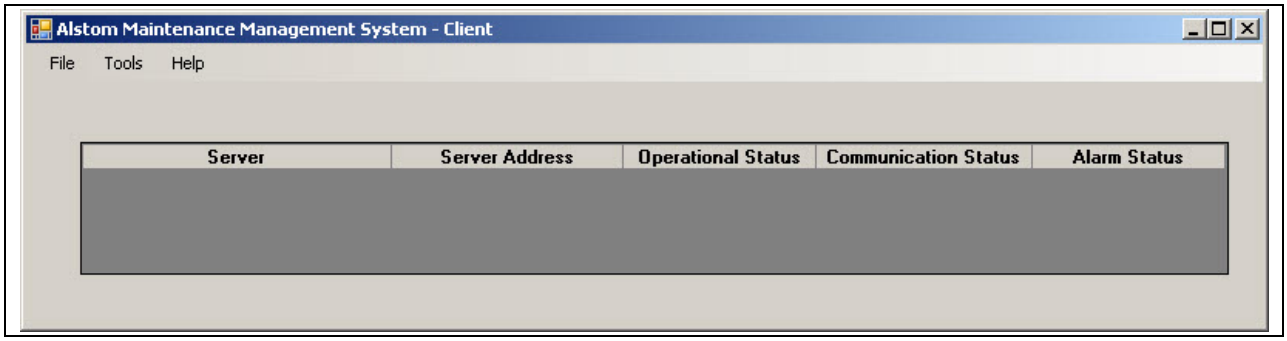


Figure 4–5. Server Connection Refresh in Progress

4.3.3.4 Options

Select this option to configure the status indication-to-color association used in the MMS Client Location Panel. Use this option to also assign a sound file to alarms. Follow the procedure in Table 4–5.

Table 4–5. Setting MMS Client Color/Sound Options

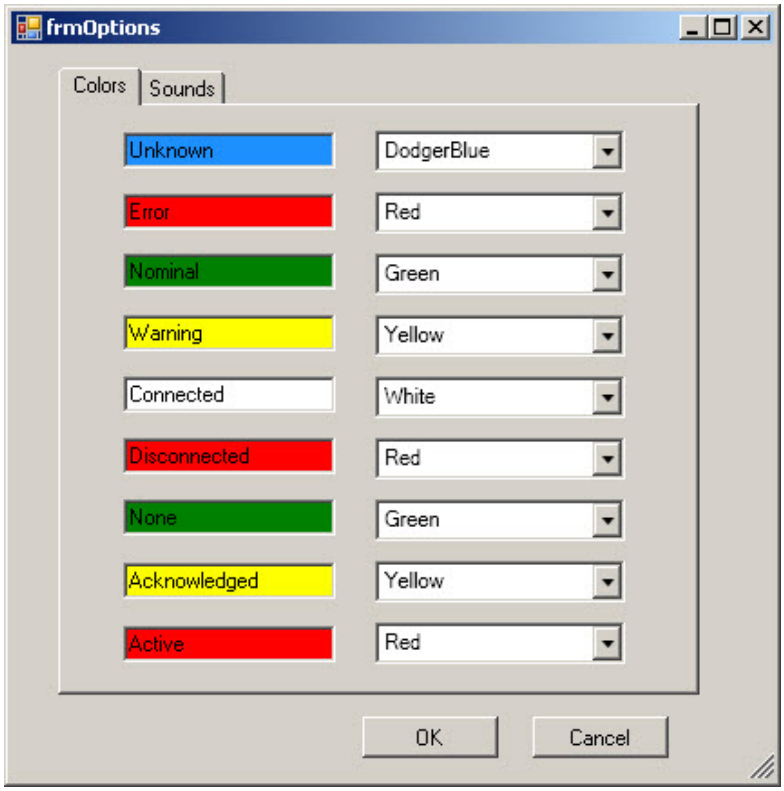
Step	Action
1	From the MMS Client user interface, select ***Tools | Options***. The Options window opens with the Colors tab in front. 

Table 4–5. Setting MMS Client Color/Sound Options (Cont.)

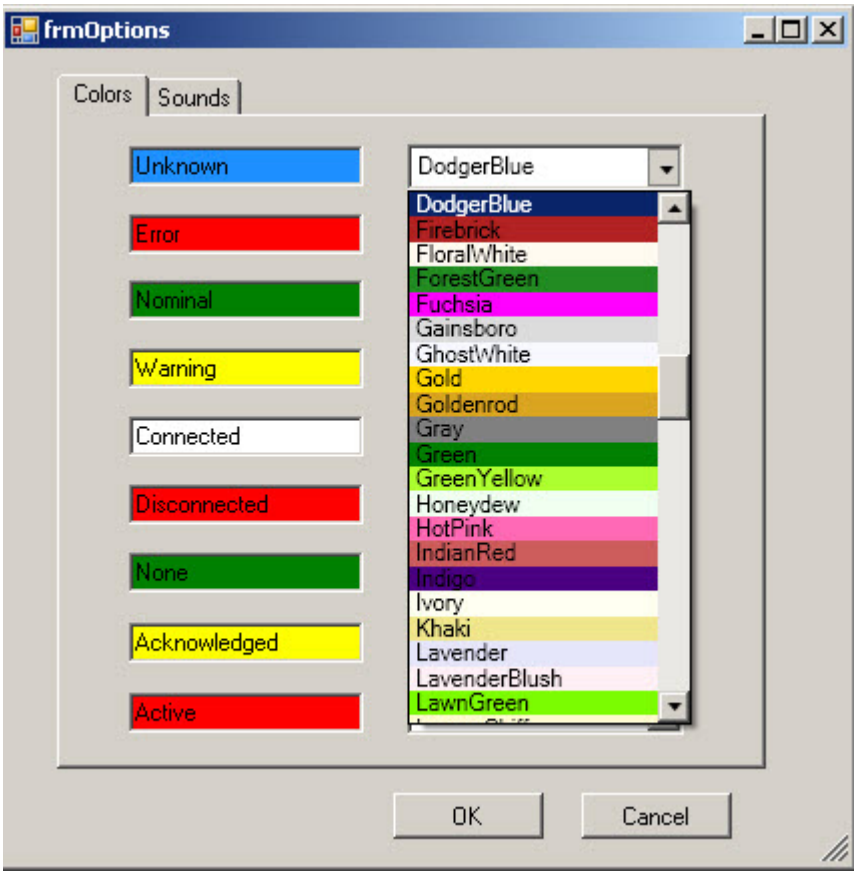
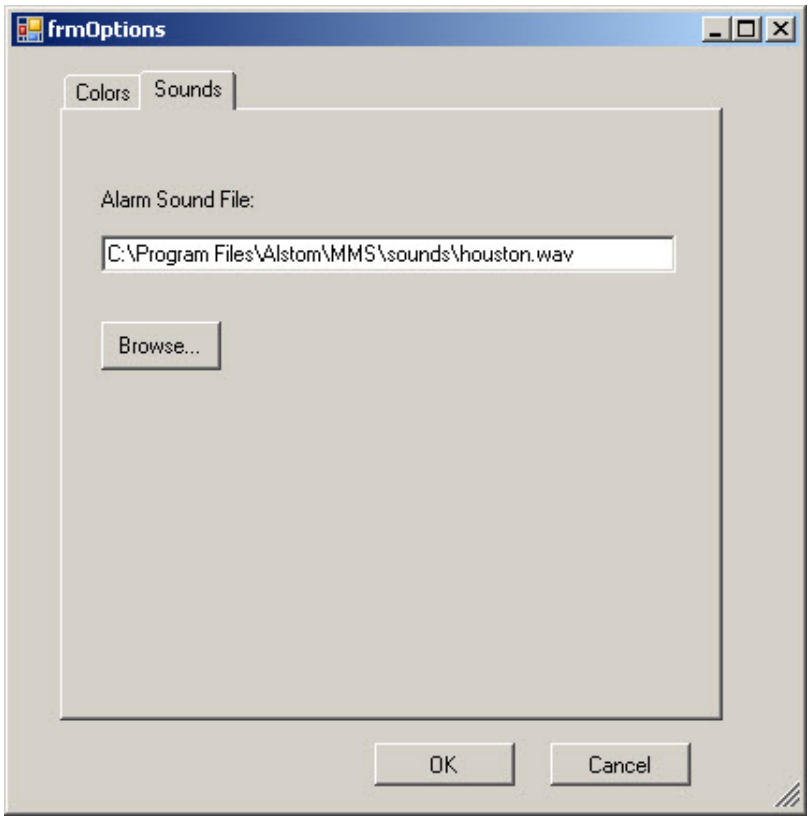
Step	Action
2	To change the default color association for the server status indications, click on the color menu to the right of the desired status indication. Select the desired color.  Repeat this step to change the color association for other status indications.

Table 4–5. Setting MMS Client Color/Sound Options (Cont.)

Step	Action
3	To assign a sound file to alarms, click the Sounds tab.  Click the ***Browse*** button and select a sound file from the default location (shown above), or navigate to another file location and select the desired sound file.
4	Click ***OK*** to save color and sound associations made and close the Options window. The MMS Client returns.

4.3.3.5 Task Scheduler

Use the Task Scheduler to add and manage tasks (for example, system maintenance tasks). Follow the procedure in Table 4–6.

Table 4–6. Using the Task Scheduler

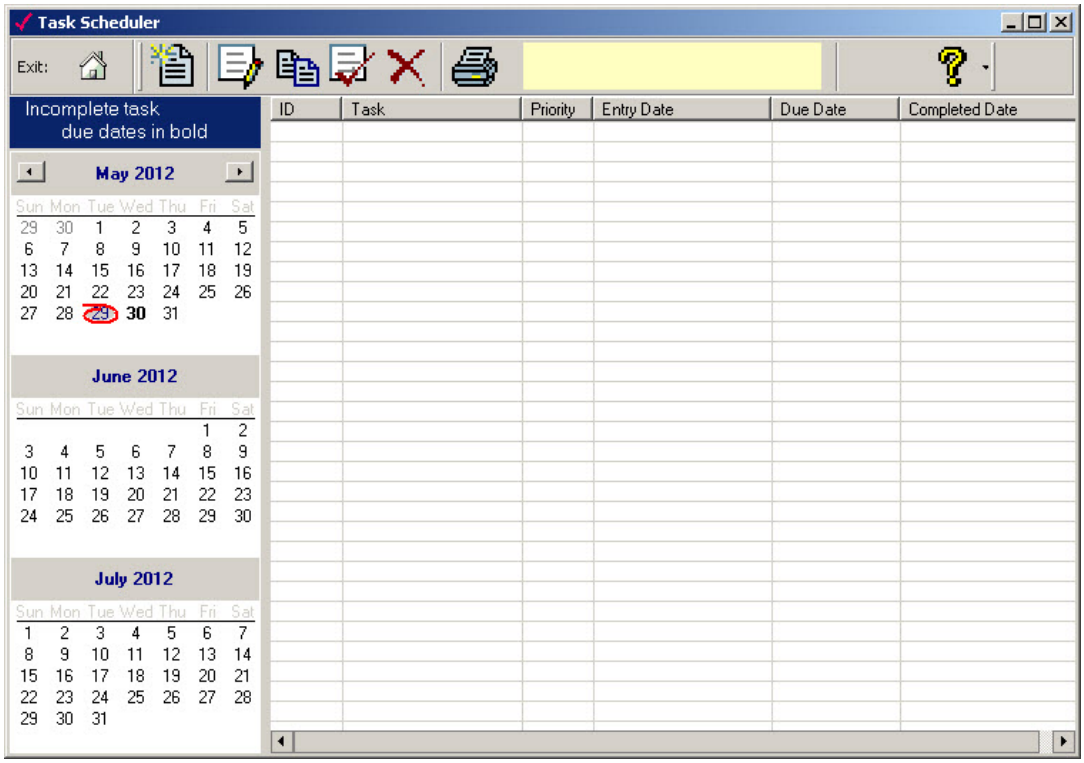
Step	Action
1	From the MMS Client user interface, select ***Tools | Task Scheduler***. The Task Scheduler window opens. 

Table 4–6. Using the Task Scheduler (Cont.)

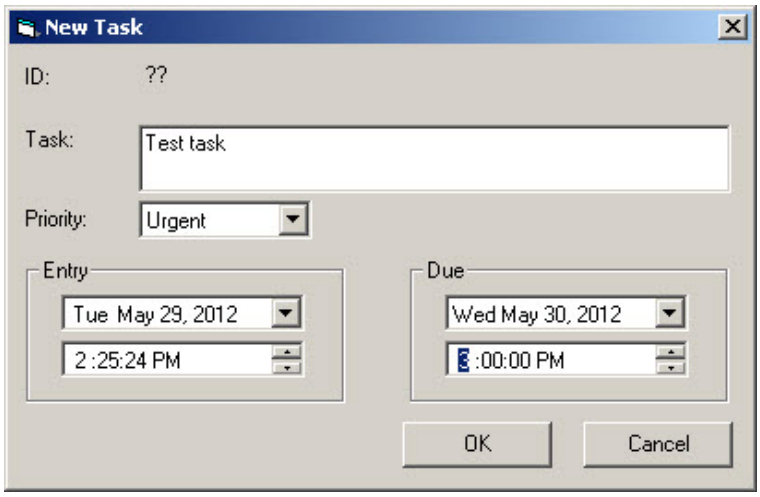
Step	Action
2	To add a new task, click the ***New Task*** button ( ). The New Task window opens.  Complete the fields as follows: • **Task:** Enter a descriptive name for the new task. • **Priority:** Select a priority for the new task (Low, Normal, Urgent). • **Entry:** Select the date and time that the new task was entered. • **Due:** Select the date and time that the new task must be completed by. Note: The Task Scheduler assigns the ID number when the new task is added (by clicking ***OK*** on the New Task window). Click ***OK*** when done. The New Task window closes and the Task Scheduler returns.

Table 4–6. Using the Task Scheduler (Cont.)

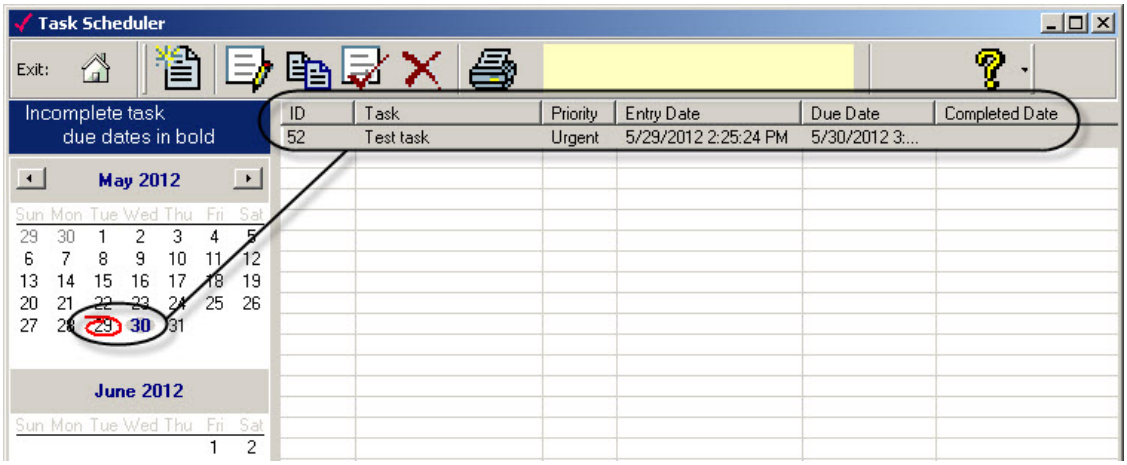
Step	Action
3	To view a scheduled task, in the left-hand column in the Calendar pane, click on a date in **bold**. Any tasks scheduled to be completed appear in the Task pane. Note: A **bold** date = task due date; a red-circled date = task assigned date.  The Task pane consists of the information entered in the New Task window (see previous Step). Note: The ID cell is a read-only cell. The Task Scheduler assigns the ID number to each new task. A task can be edited, copied, marked as completed, deleted, or printed. See the following steps for more information.

Table 4–6. Using the Task Scheduler (Cont.)

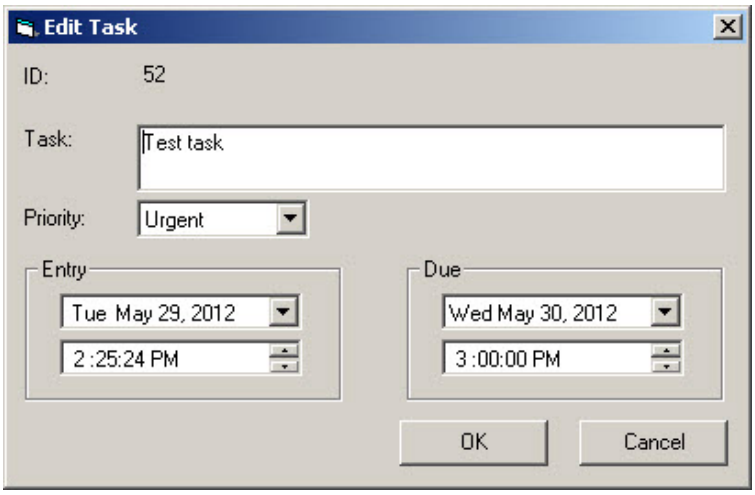
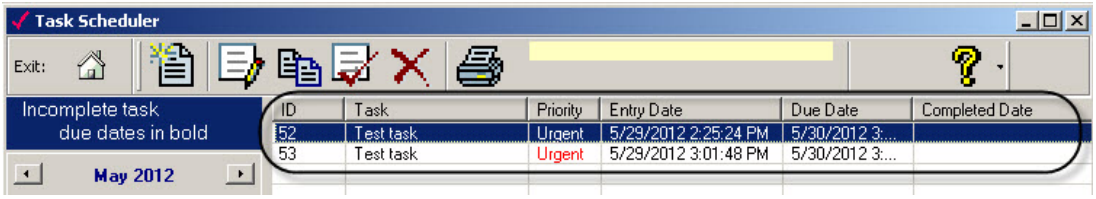
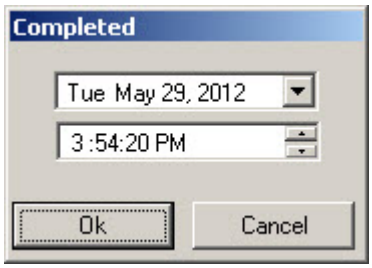
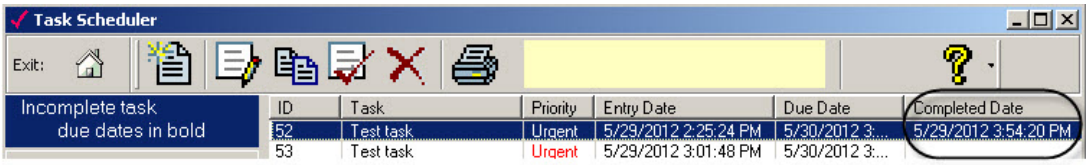
Step	Action
4	To change an existing task, select a task in the Task pane and click the ***Edit Task*** button ( ). The Edit Task window opens.  Edit the fields as needed. The ID field is read-only. See Step 2 for field descriptions. Click ***OK*** to save changes and close the Edit Task window. The Task Scheduler returns.
5	To copy an existing task, select the task to be copied and click the ***Copy Task*** button ( ). The new task appears in the Task pane below the task from which it was copied. The Task Scheduler assigns a new ID to the copy. 

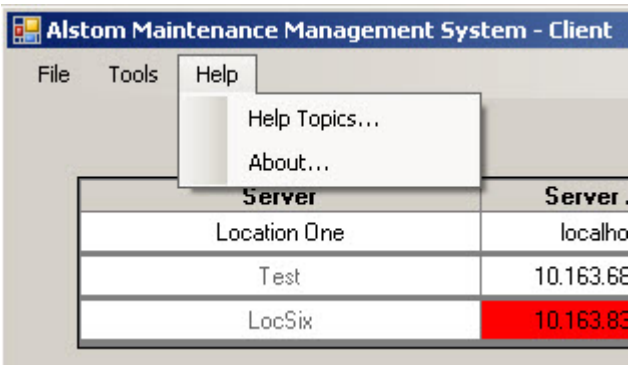
Table 4–6. Using the Task Scheduler (Cont.)

Step	Action
6	To mark a task as completed, select the task and click the ***Complete Task*** button ( ). The Completed window opens.  Select the date and time and click ***OK***. The selected date/time appears in the Completed Date column in the Task pane. 
7	To delete a task, select the task and click the ***Remove Task*** button ( ). Note: There is no undo with the Remove function.
8	To print a task report, select the task and click the ***Print Task*** button ( ) to send a task report to the default printer.

4.3.4 MMS Client Help

To access the embedded help file and About screen provided in the MMS Client application, follow the procedure in Table 4–7.

Table 4–7. Accessing the MMS Client Help

Step	Action
1	From the MMS Client User Interface, select the Help menu.  There are two options under Help. Select the desired option. • **Help Topics:** Select this option to open the MMS Cleint help file. The help file contains information on how to configure and operate the MMS Client application. • **About:** Select this option to open the MMS Client About screen. This screen shows the client release version and license code.

4.4 SECURITY LEVELS

MMS provides three levels of security service upon login.

If login is done when the MMS Client application starts up, the user name and password is cached in MMS and sent to each MMS Server application (location) when the location is accessed from the MMS Client Location Panel. See Section 4.2 for more information.

Security login can also be done after the MMS Client application is started. See Section 4.3.3.1 for more information. See Table 4–8 for functions available at each security level.

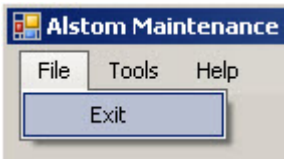
Table 4–8. Security Levels and Functions

Security Level	Function
Level 1 (default)	View locations For each location: • **Panel:** Remote control only (no control functions), full alarm control (for example, alarm mute and acknowledge) • **Options:** View-only • **Diagnostics:** Full control except edit comments, clear diagnostics, modify inhibits • **Application Explorer:** Full control; no change of options • **Log Manager:** Create and print reports • **Configuration Manager:** Validate and print • **Task Scheduler:** View and print; no edit • **Communication Explorer:** Network statistics only
Level 2	All Level 1 plus For each location: • **Panel:** Full control, full alarm control (for example, alarm acknowledge) • **Options:** Full control • **Diagnostics:** Full control • **Application Explorer:** Full control • **Log Manager:** Full control • **Configuration Manager:** Full control • **Task Scheduler:** Full control • **Communication Explorer:** Network statistics only
Level 3	All Level 2 plus • Add/edit/delete user accounts • Read security logs

4.5 MMS CLIENT SHUTDOWN

To shut down (exit) the MMS Client application, follow the procedure in Table 4–9.

Table 4–9. Shutting Down the MMS Client

Step	Action
1	From the MMS Client User Interface, select the ***File*** **|** ***Exit***.  The MMS Client application closes.

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SECTION 5 – MMS EDITOR

5.1 OVERVIEW

This section explains how to:

- Configure MMS Editor options (Section 5.3)
- Create a new MMS project (Section 5.4)
- Build the location model (Section 5.5)
- Import CAAPE data (Section 5.6)
- Link VPI variables to symbol parameters (Section 5.7)
- Add MMS specific data (Section 5.8)
- Create a summary report (Section 5.9)
- Print a layout drawing (Section 5.10)

5.2 MMS EDITOR USER INTERFACE

The MMS Editor, shown in Figure 5–1, imports CAAPE project data from an MMS file (CAAPE 6A or later) or the files listed and described in Table 5–8. Use of the MMS file is desirable as it contains additional information not gathered through the .cpb files.

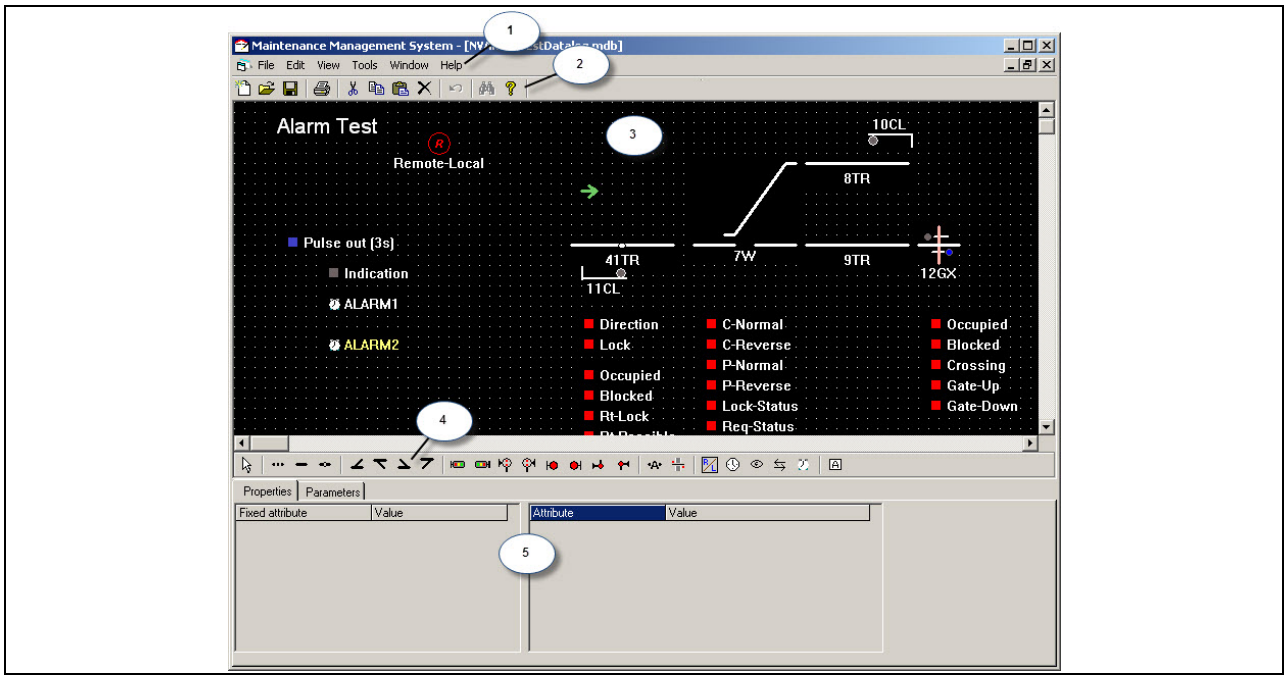


Figure 5–1. MMS Editor User Interface

See Table 5–1 for descriptions of the MMS Editor user interface.

Table 5–1. MMS Editor User Interface Descriptions

Callout	Description
1	Menus • **File:** Open, close, create and save, projects; import from CAAPE/ synchronize with CAAPE • **Edit:** Cut, copy, paste, delete; add additional MMS data and edit MMS Editor messages • **View:** Show/hide the toolbar; refresh the Layout area • **Window:** Cascade and tile open windows; arrange icons • **Help:** Open the MMS online help file, MMS Editor tutorial, MMS Editor About window
2	Toolbar • : Create a new project • : Open an existing project • : Save the open project • : Print a layout drawing • : Cut data to the clipboard • : Copy data to the clipboard • : Paste data from the clipboard • : Delete selected data/object • : Undo previous action • : Use the Find function • : Open the MMS online help file
3	Layout area. Use this area to place symbols.
4	Symbol toolbar
5	Attributes/Parameters tabs

5.3 CONFIGURE MMS EDITOR OPTIONS

To modify user preferences in the MMS Editor application, follow the procedure in Table 5–2.

Table 5–2. Modifying MMS Editor User Preferences

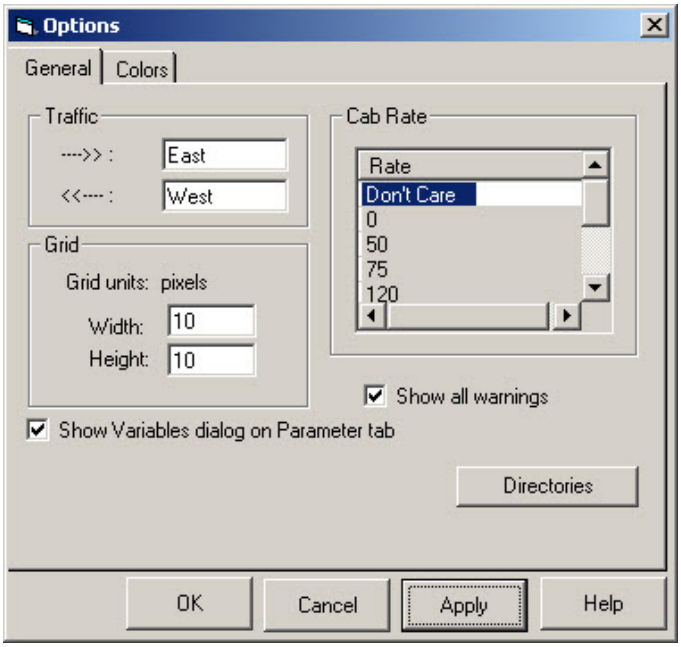
Step	Action
1	From the MMS Editor application, select ***Tools | Options***. The Options window opens with the General tab in front.  Configure the options on the General tab. See Table 5–3 for descriptions. Click ***Apply*** to save changes without closing the Options window.

Table 5–2. Modifying MMS Editor User Preferences (Cont.)

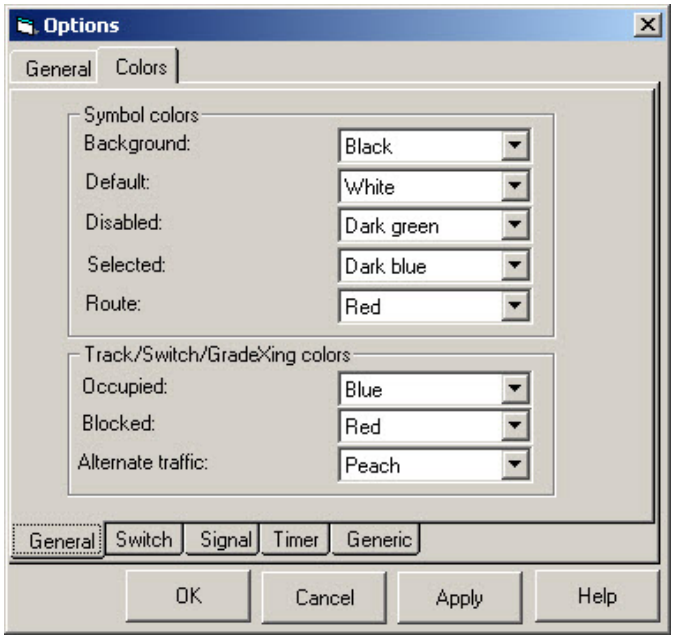
Step	Action
2	Click the Colors tab.  This tab consists of 5 sub-tabs to configure color aspects. See Table 5–4 for descriptions. Click ***OK*** to save changes and close the Options window.

Table 5–3. General Tab Preferences

Preference	Description
Directories	Default folders for project files
Traffic	Text for direction (not used)
Grid	Size in pixels of grid spacing (5 to 25); symbols are snapped to the nearest grid
Cab Rate	Table of cab signal rates (not used)
Show All Warnings	Enable all warning dialogs to be shown
Show Variable Dialog on Parameters Tab	Displays variables dialog to allow variable linking

Table 5–4. Colors Tab Sub-tabs

Colors Tab	Preference
General Tab	• **Background:** Color of drawing area background • **Default:** Default color of Track, Switch and Grade Crossings • **Select:** Border color of symbol when selected • **Route:** Color to indicate part of route • **Occupied:** Color of Track, Switch and Grade Crossing when occupied • **Blocked:** Color of Track, Switch and Grade Crossing when blocked • **Alternate Track:** Default Alternate track color
Switch Tab	**Locked:** Color of locked indication
Signal Tab	• **Pending:** Color of border when request is pending • **Failed:** Color of border when request has failed
Timer Tab	**Running:** Color of symbol when running
Generic Tab	• **Indication:** Color of symbol when indication is set • **Direction:** Default color of Direction Indicator • **Locked:** Color of Direction Indicator when locked

5.4 CREATE A NEW MMS PROJECT

Follow the steps outlined in Table 5–5 to create a new MMS project.

Table 5–5. Creating a New MMS Project

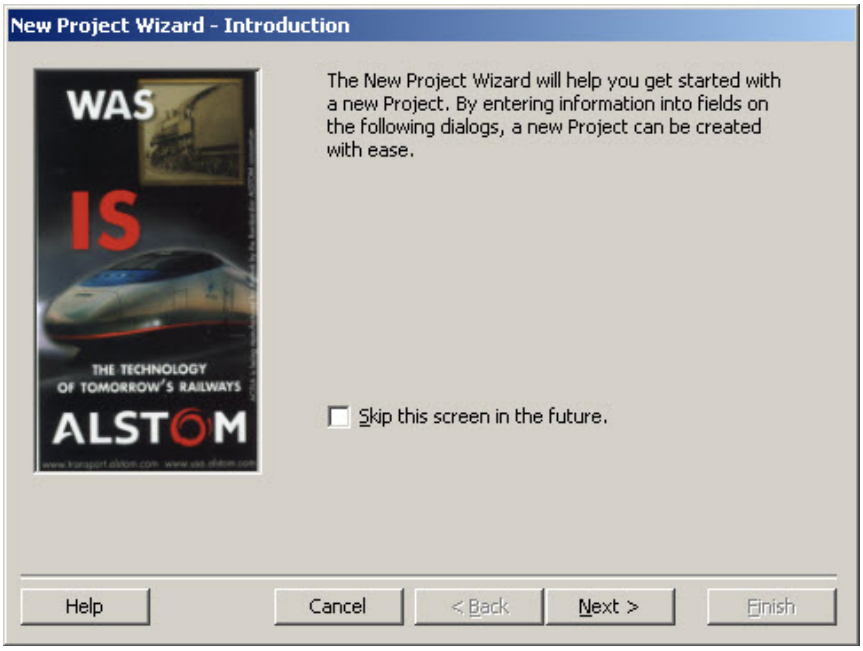
Step	Action
1	From the MMS Editor application, select ***File | New***. The New Project Wizard opens.  Click ***Next***.

Table 5–5. Creating a New MMS Project (Cont.)

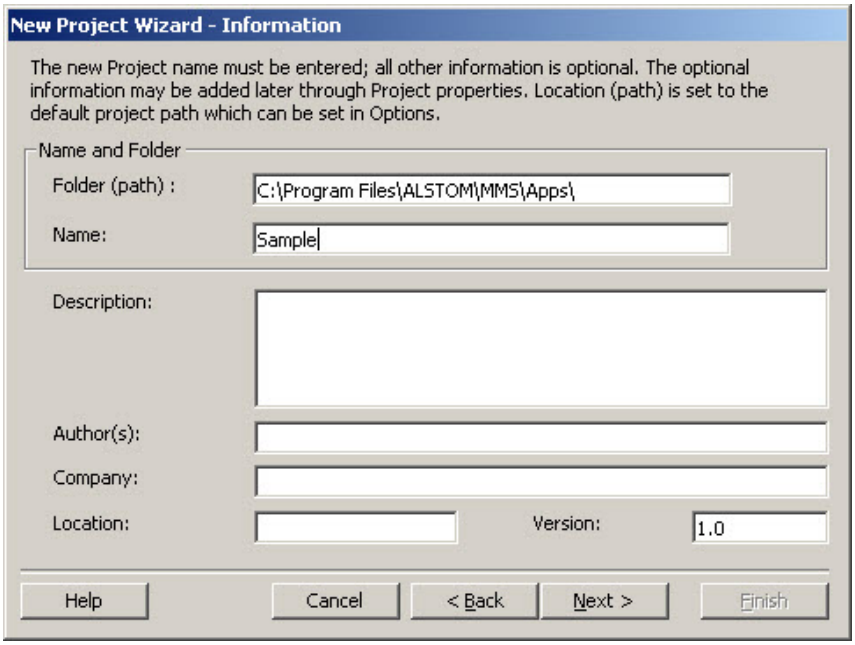
Step	Action
2	The Information window opens.  In the **Name and Folder** section, enter the path to the project folder location (the folder must already exist) and a name for the new project. Additional fields are optional. Click ***Next***.

Table 5–5. Creating a New MMS Project (Cont.)

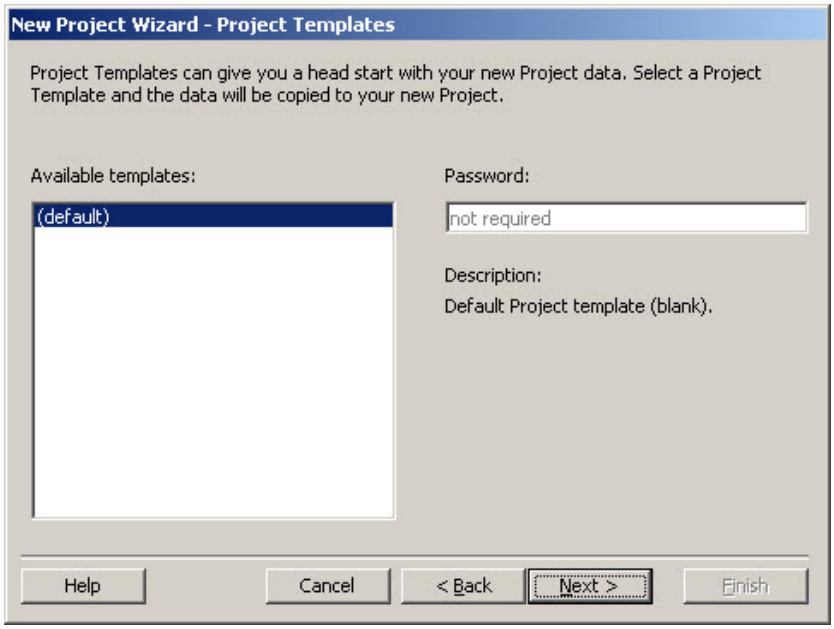
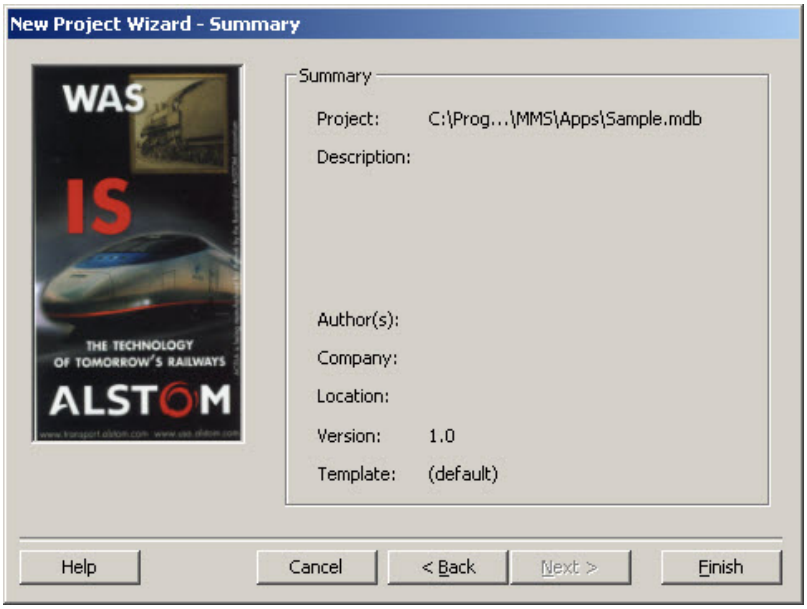
Step	Action
3	The Templates window opens.  Select the default template. The first time the MMS Editor application is used this is the only available template. Use the default template to create a default MMS project. Once a project is created it can be saved as a template (using ***File | Save As***). Any previous MMS Project saved as a template appears in the list of available templates. All project data, except linked variables, is saved in a template. To use a template that was saved with a password, enter the password designated at file creation. Click ***Next***.

Table 5–5. Creating a New MMS Project (Cont.)

Step	Action
4	The Summary window opens.  The Summary window shows the entries made on the Information and Template windows. • If the listed entries are correct, click ***Finish***. The project database is created with the default information. • If the listed entries are not correct, click ***Back*** to return to the desired data window and correct any inaccurate data. Click ***Next*** to return to the Summary window. Click ***Finish*** to create the project database.

5.5 BUILD THE LOCATION MODEL

The user builds the location model using symbols from the symbol tool bar.

See SECTION 7 – Symbols for a summary of the available symbols and their icons. Follow the procedure in Table 5–6 to build a location.

Table 5–6. Building the Location Model

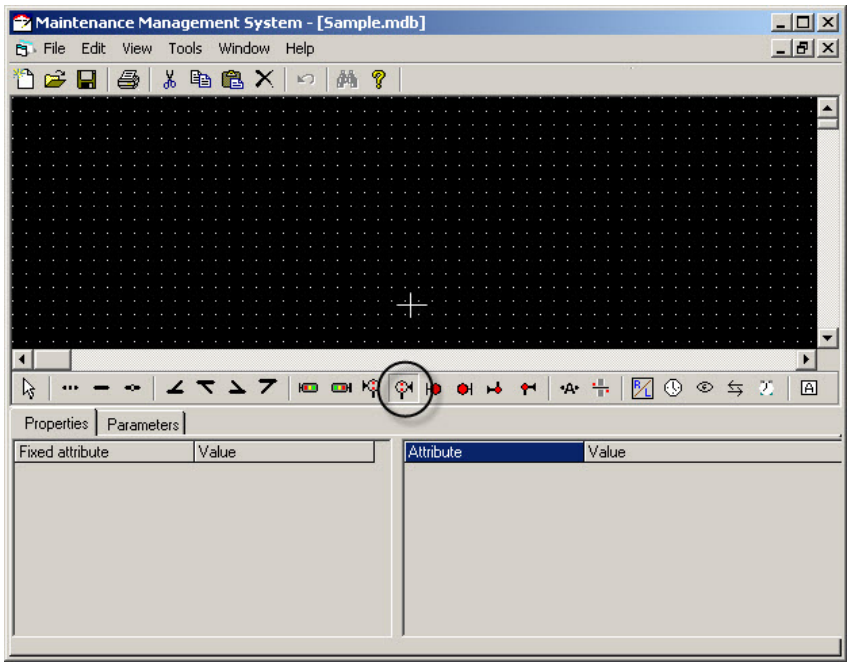
Step	Action
1	From the Symbol toolbar in the MMS Editor application, select a symbol from the symbol toolbar. The mouse pointer is displayed as thin cross hairs.  Maintenance Management System - [Sample.mdb] File Edit View Tools Window Help Properties Parameters Fixed attribute Value Attribute Value

Table 5–6. Building the Location Model (Cont.)

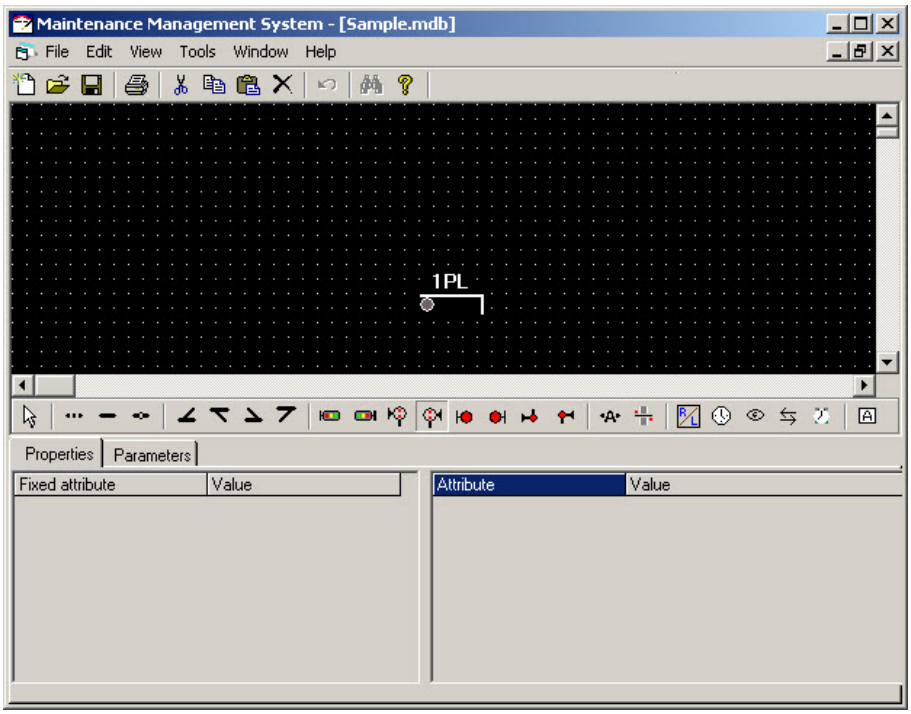
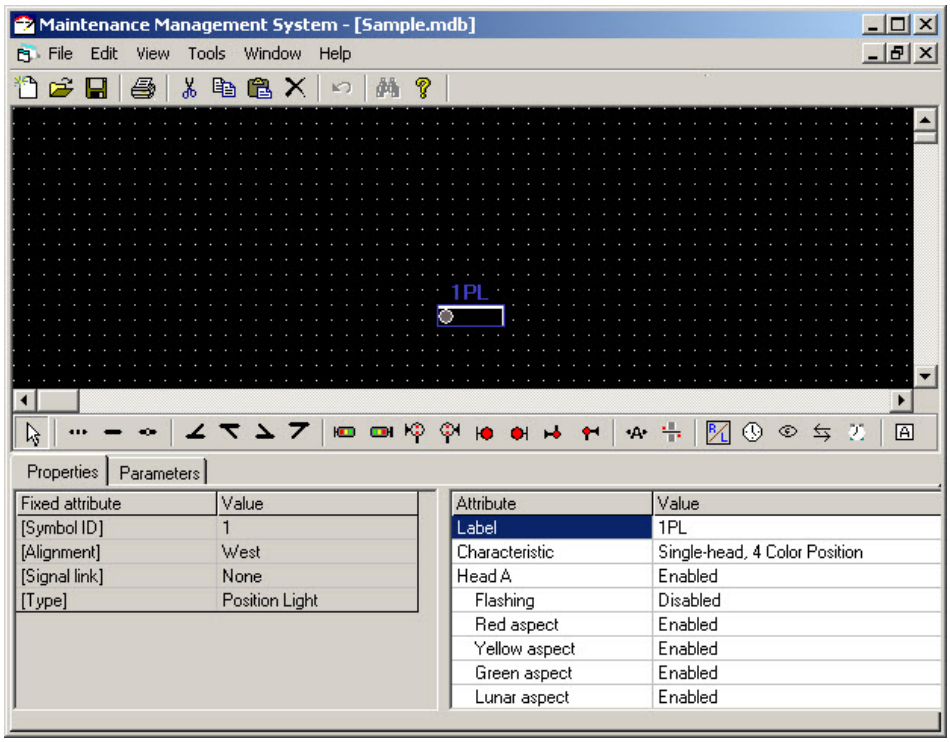
Step	Action
2	Click in the Layout Area to place the symbol. See SECTION 7 – Symbols for symbol information.  To place multiple symbols, continue clicking the mouse button.
3	Click the right mouse button to return the mouse pointer to the Select arrow.

Table 5–6. Building the Location Model (Cont.)

Step	Action
4	Select a symbol by left-mouse clicking over a symbol in the Layout area. The border is drawn in the selected color.  Multiple symbols can be selected by holding the control key down while performing the select operation or by highlighting a selection area. Symbols can be moved, cut, copied or deleted. Symbols that are cut or copied can be pasted. All operations can be undone. The undo buffer is limited only by available memory.

When a symbol is selected, the Properties tab lists the symbol properties and values (such as connections to other symbols and display parameters).

Attribute property values whose Attribute names (left column) are not enclosed in square brackets [ ] are editable. These values are edited by either choosing from a drop-down list of items or entering values. Up and Down arrow keys can be used to navigate through the properties table.

Note: Fixed attribute property values cannot be edited.

The Parameters tab lists the symbol parameters and linked VPI variables.

5.6 IMPORT CAAPE DATA

VPI module board layout, communication port, link variable, data logger and configuration information is gathered from CAAPE project files. To import the data follow the procedure in Table 5–7.

Table 5–7. Importing CAAPE Data

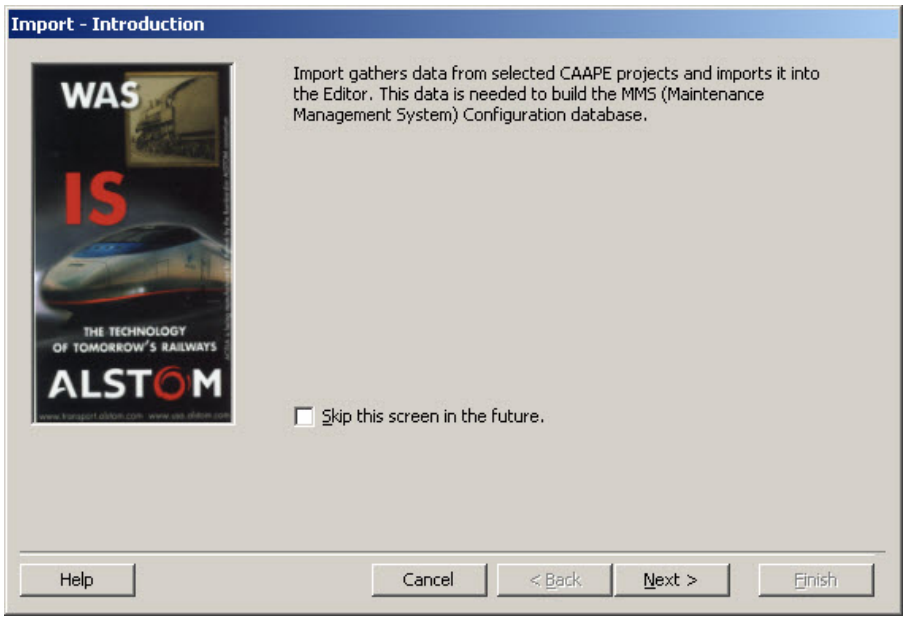
Step	Action
1	From the MMS Editor application, select ***File | Import from CAAPE***. The Import Wizard opens.  Click ***Next***.

Table 5–7. Importing CAAPE Data (Cont.)

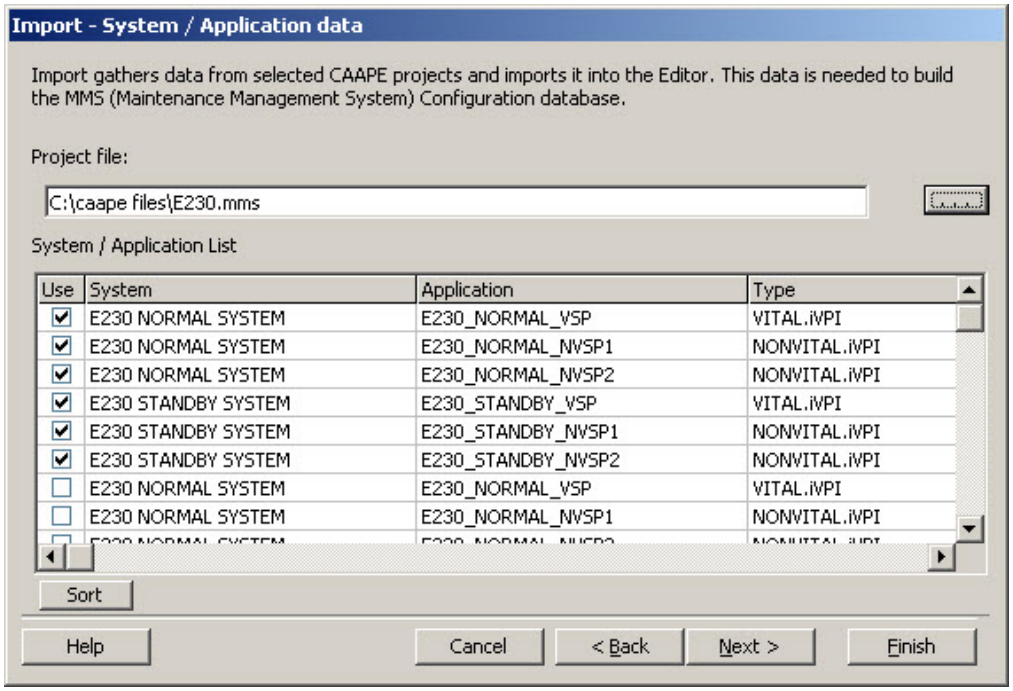
Step	Action
2	The System/Application Data window opens.  To add new system applications, click the ***...*** button and browse to the CAAPE project file (extension .mms or .cpb). All system applications found in the project are added to the system/applications list. Repeat this step to add additional CAAPE projects. Click ***Next***.

Table 5–7. Importing CAAPE Data (Cont.)

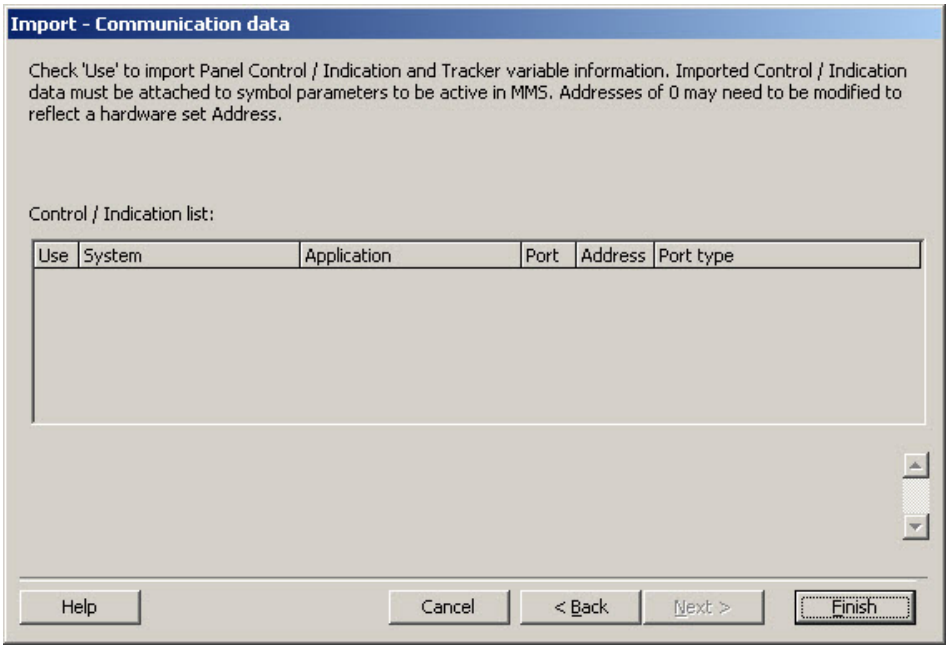
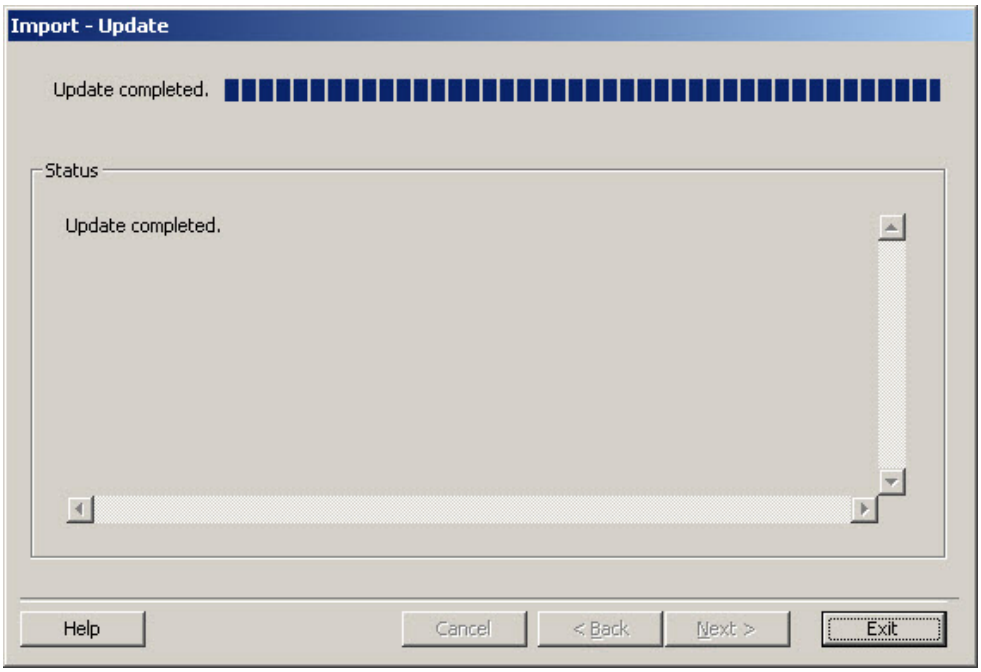
Step	Action
3	The Communication Data window opens.  Check ***Use*** to include the application data in the import list. System and Application names may be modified (these names are used in MMS) in the attributes/parameters table on the screen. Any serial port Panel or Tracker messages are listed in the Controls/Indications list. Check ***Use*** to include this information in the imported data. The station number may be modified (it must match the VPI station number for this port for communications to operate properly) in the attributes/parameters table on the screen.

Table 5–7. Importing CAAPE Data (Cont.)

Step	Action
4	Click ***Finish***. The selected CAAPE project files are imported. When the import is complete, the Update window opens.  Click ***Exit***.

To update existing application data, select ***File | Synchronize to CAAPE***.

See Table 5–8 for CAAPE data imported by the MMS Editor application.

Table 5–8. CAAPE Project Data Imported by the MMS Editor When .CPB is Used

File Extension	Description
.%BV	CAAPE build file for configuration information.
.caq	VPI CSEX data log variables and sources
.cfn .cfg	Configuration files created and saved in the Reports folder when a compile is done in CAAPE. These files have a .cfg extension for Vital applications and a .cfn extension for non-vital applications.
.cpb	CAAPE project file used to gather top level information and all other files
.csi	VPI CSEX data log ports and features
.css	Communications file to gather port information and VPI variables that can be linked to the graphical symbols
.lvc .lcs	Vital and non-vital variable information; files are copied as part of the MMS project data
.hdw	Module board layout description

5.7 LINK VPI VARIABLES TO SYMBOL PARAMETERS

To link a VPI variable to a selected symbol's parameter follow the procedure in Table 5–9.

Table 5–9. Linking VPI Variables to Symbol Parameters

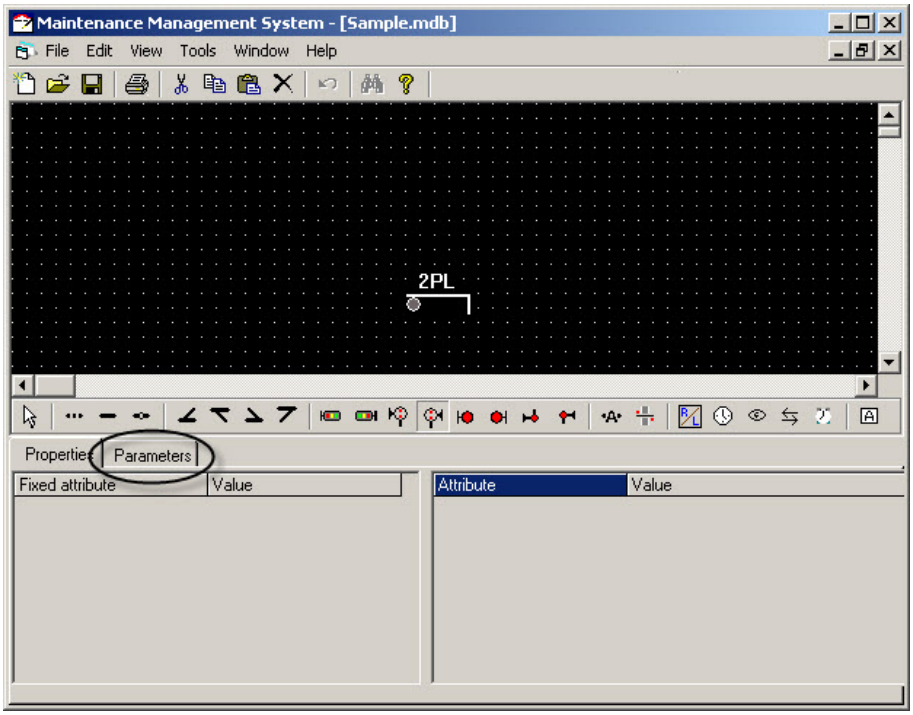
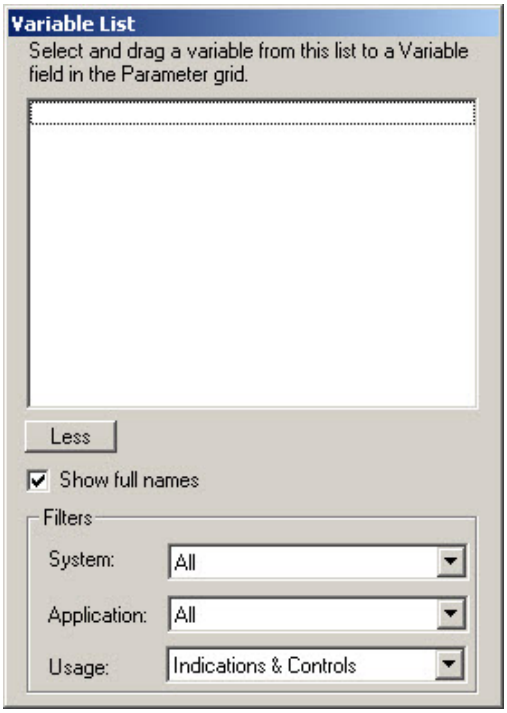
Step	Action
1	From the MMS Editor application, select the Parameters tab. Note: Ensure that the ***Show Variable dialog on Parameters tab*** option is checked in ***Tools | Options*** (see Table 5–2, Step 1) and that CAAPE data is imported (see Section 5.6). 

Table 5–9. Linking VPI Variables to Symbol Parameters (Cont.)

Step	Action
2	The Variable List window opens.  Use the mouse to “drag and drop” the symbol for the required variable to the Variable field of the Parameter. Control type variables can only be linked to control type parameters. Control variables are data received by the VPI (MMS → VPI). Indication variables can only be linked to indication parameters. Indication variables are data sent by the VPI (VPI → MMS). Only one indication variable can be linked to a parameter; multiple control variables can be linked to a parameter.
3	To remove the link(s), select the Variable field and press the Delete key on the keyboard. There is no undo command for links.

5.8 ADD MMS SPECIFIC DATA

Use the Additional Data Wizard to add MMS communication port and additional hardware information to the MMS project database.

Note: Using this function of the MMS Editor application is not required because the communication port information can be added later in the MMS Server application, and the additional hardware information is optional. The MMS Editor and MMS Server applications can use the same database.

Table 5–10. Adding MMS Data to the Build File

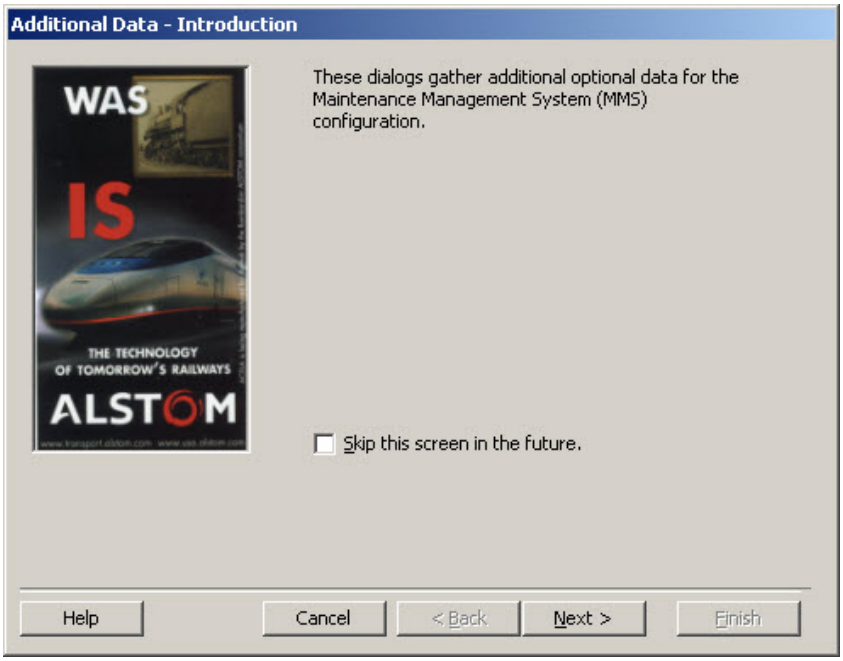
Step	Action
1	From the MMS Editor application, select **Edit | Additional MMS Data**. The Additional Data Wizard opens.  Click ***Next***.

Table 5–10. Adding MMS Data to the Build File (Cont.)

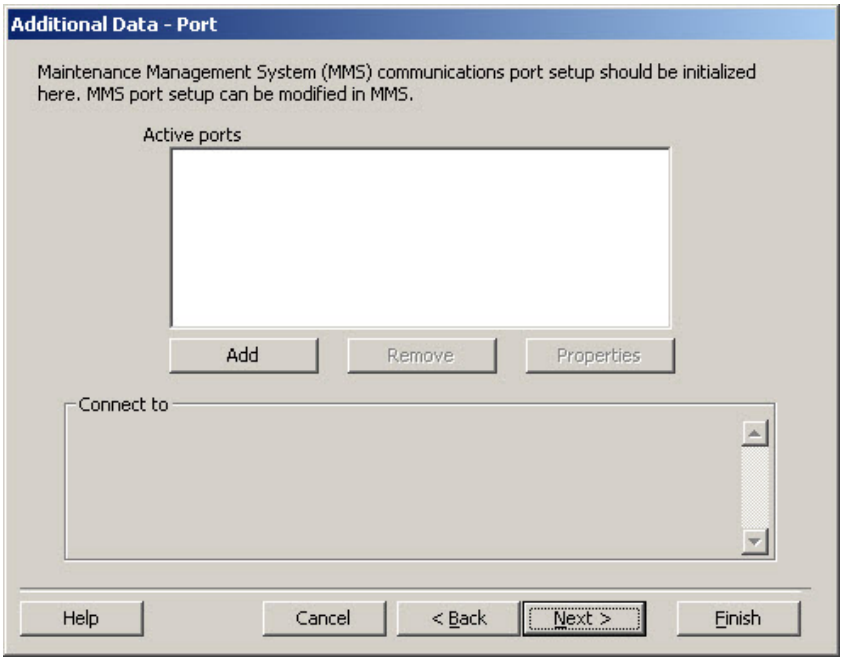
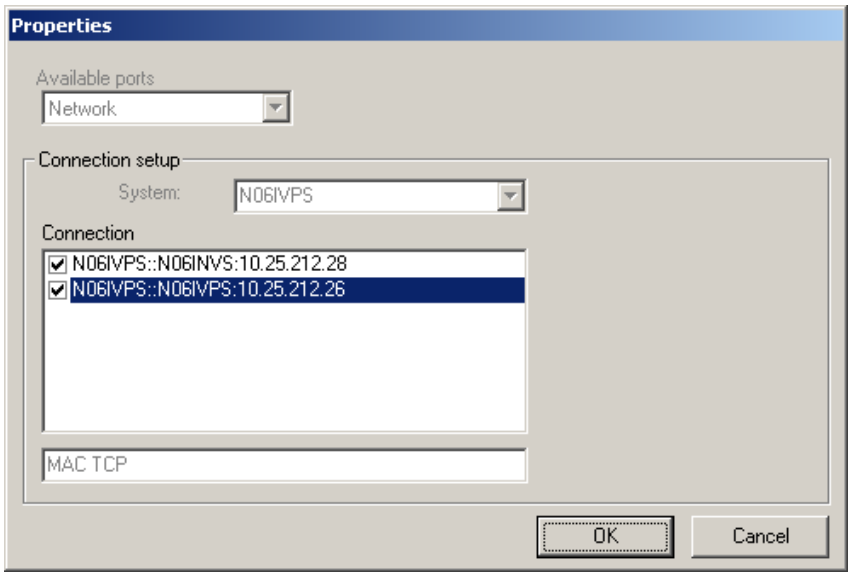
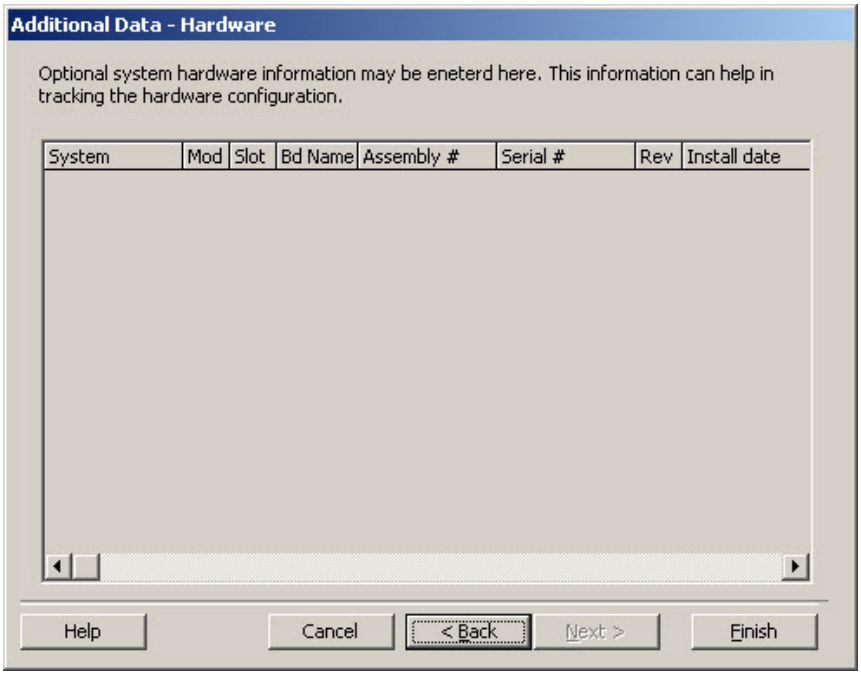
Step	Action
2	The Port window opens.  • To add a port, select the port and click ***Add***. • To remove a port, select the port and click ***Remove***. • To configure a port, select the port, click ***Properties,*** and select the desired ports to which MMS should connect.  Click ***Next***.

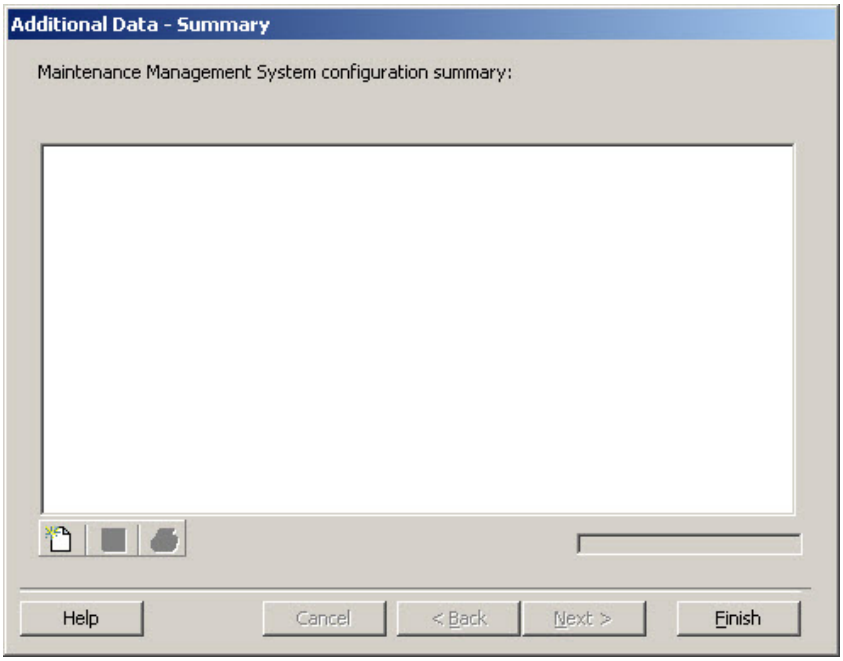
Table 5–10. Adding MMS Data to the Build File (Cont.)

Step	Action
3	The Hardware window opens.  Enter any additional hardware information (optional).
4	Click ***Finish***. The Additional Data Wizard closes.

5.9 CREATE A SUMMARY REPORT

The MMS Editor application can create a summary report.

Table 5–11. Creating a Summary Report

Step	Action
1	From the MMS Editor application, select ***Tools | Summary Report***. The Additional Data – Summary window opens. 
2	To create a report, click ***New Report***.
3	To save the report, click ***Save***. To print the report, click ***Print***.
4	To close the Additional Data – Summary window, click ***Finish***.

5.10 PRINT A LAYOUT DRAWING

The MMS Editor can print a layout drawing.

Table 5–12. Printing a Layout Drawing

Step	Action
1	From the MMS Editor application, select ***File*** **|** ***Print*** or click the ***Print*** button in the toolbar.
2	The Print window opens for the default printer assigned to MMS. Make any printing adjustments as needed, and then send the file to the default MMS printer. Note: The layout can only be printed on a single sheet, automatically sized to fit.

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SECTION 6 – MMS CLIENT RUNTIME

6.1 OVERVIEW

This section explains how to:

- Access the MMS Client Runtime application (Section 6.2)
- Use the MMS Client Runtime application (Section 6.3)

Typically, an application engineer creates the MMS project file for the location using the MMS Editor application (see SECTION 5 – MMS Editor).

The maintenance personnel uses the MMS Client Runtime application to.

- Monitor and troubleshoot the VPI system
- Access recorded or live system data

6.2 ACCESSING MMS CLIENT RUNTIME

To launch the MMS software and access the desired system data follow the steps in Table 6–1. Detailed explanations of the various screens in MMS Client Runtime follow.

Table 6–1. Starting the MMS Client Runtime Application

Step	Action
1	Ensure that the VPI system is connected to the MMS workstation. See Section 3.2 for VPI system-to-MMS workstation connections.
2	Start the MMS Server (Section 3.2) and MMS Client (Section 4.2) applications.
3	From the MMS Client application, double-click on a location (MMS Server) in the Locations Panel (see Section 4.3.2). The MMS Client Runtime application opens for the selected location. Note: An unknown Control System status on startup is most likely due to an MMS Server port to VPI MAC port communication problem.
4	The MMS Client Runtime application opens. See the following list for more information: • To display system control system status, control data, and indication data use the Main Screen, see Sections 6.3.1.1 through 6.3.1.6. • To display hardware status and diagnostic data along with troubleshooting and suggested solutions use the Maintenance Diagnostics Screen, see Section 6.3.2. • To display VPI application variable data for tracing possible problems use the Application Explorer screen, see Section 6.3.3. • To retrieve VPI CSEX Data Logs use the Log Manager Screen, see Section 6.3.4. • To display VPI control system hardware and firmware configuration information use the Configuration Manager Screen, see Section 6.3.5. • To display and schedule maintenance tasks use the Task Scheduler Screen, see Section 6.3.6.

6.3 MMS CLIENT RUNTIME USER INTERFACE

The MMS Client Runtime application opens to the Main Screen.

Once MMS Client Runtime is started, the project layout display is shown and initialization is performed. If the selected MMS Server is configured to connect to VPI via DataTrain VIII communications ports, the status of those ports is displayed on the Status Bar (typically "Port x Station y is on-line").

6.3.1 Main Screen

The MMS Client Runtime application opens to the Main Screen. Use the Main Screen to display system control, system status, control data, and indication data. See Figure 6–1 and Table 6–2 for more information.

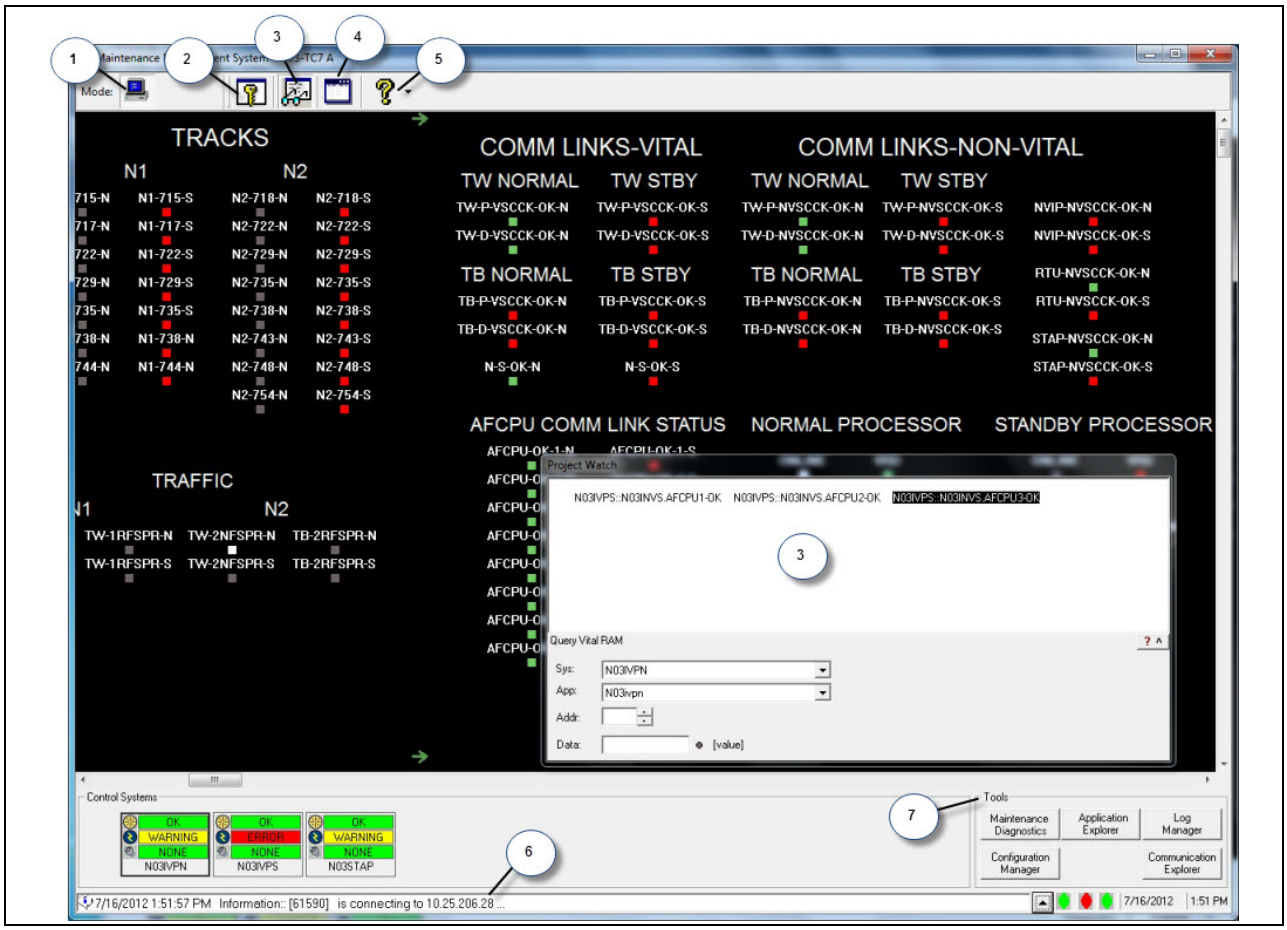


Figure 6–1. MMS Main Screen

Table 6–2. MMS Main Screen Detail

Callout	Description
1	Runtime Mode Shows Indicator Panel With Track, Switch, Signal and Generic Controls Available.
2	Log In Window Allows user to set their login credentials.
3	Project Watch Window Activated By Enable Watch Window, Displays Data. See Section 6.3.1.1 for more information.
4	Settings (Preferences) Provides configuration of software options. See Section 6.3.1.2 for more information.
5	Help Menu Provides access to the MMS online help file. See Section 6.3.1.3 for more information.
6	Status Bar Displays MMS runtime information as an expandable text list. See Section 6.3.1.5 for more information.
7	Tools Provides access to the MMS Client Runtime tools. See Section 6.3.1.6 for more information.

6.3.1.1 Project Watch Window

WARNING

The Project Watch Window is a non-vital tool. For verification of Vital parameters, the address and True and False parameter values for each parameter displayed in the MMS Project Watch Window must be manually verified to be the same as those listed in the application .LVC file reported by CAAPE.

After initial verification, their values can be observed by watching the parameter values in the Project Watch Window as long as the application software is not recompiled and the MMS project is not rebuilt.

To open (or close) the Project Watch Window, click the Project Watch Window button at the top of the MMS Main Screen. See Figure 6–2.

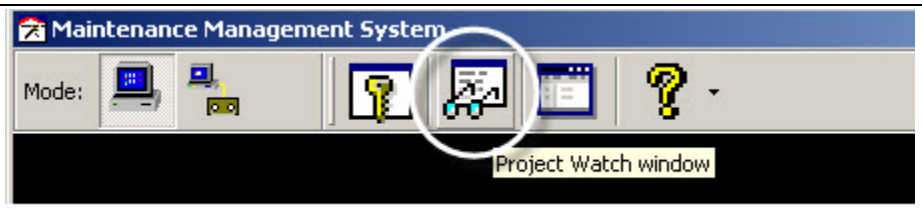


Figure 6–2. Main Screen Project Watch Window Button

The Project Watch Window displays all variables present in “active” variable groups of the Application Explorer Watch windows.

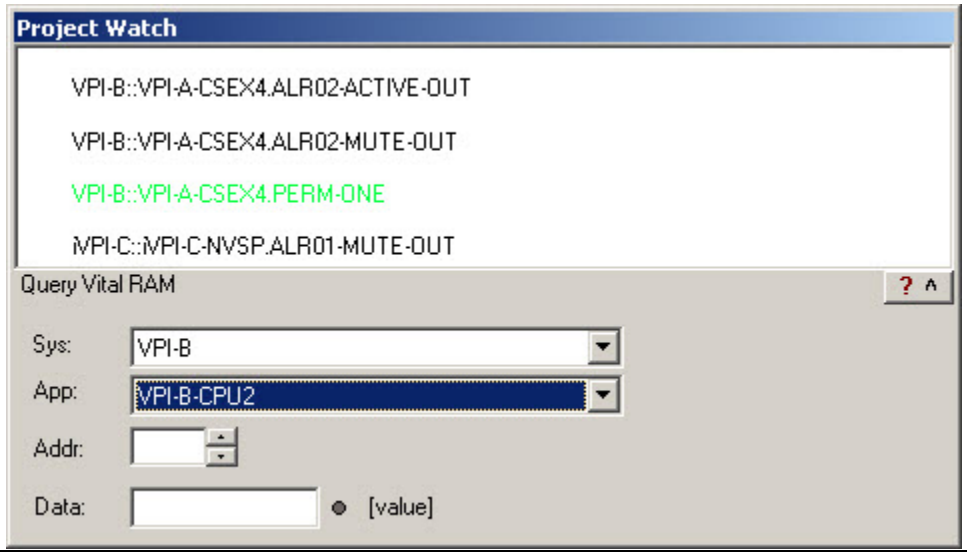


Figure 6–3. Main Screen Project Watch Window

Due to the VPI communications processing, System Status information is not gathered while the Project Watch window is active.

Individual Vital variable data can be queried through the expanded Project Watch Window. Vital variables can be dragged from the Project Watch Window to the Addr field or specific addresses can be entered. The variable name, codeword and true/false indication are displayed.

6.3.1.2 Settings (Preferences)

To open the Settings window, click the ***Preferences*** button at the top of the MMS Main Screen. See Figure 6–4.

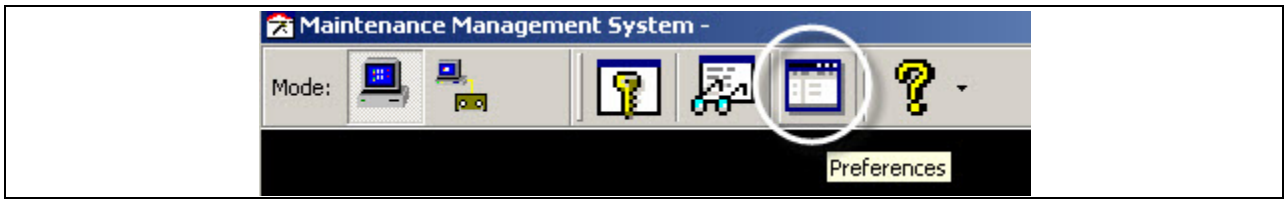


Figure 6–4. Main Screen Settings (Preferences) Button

The Settings Tabs open. See Figure 6–5 to Figure 6–7 and Table 6–3 for more information.

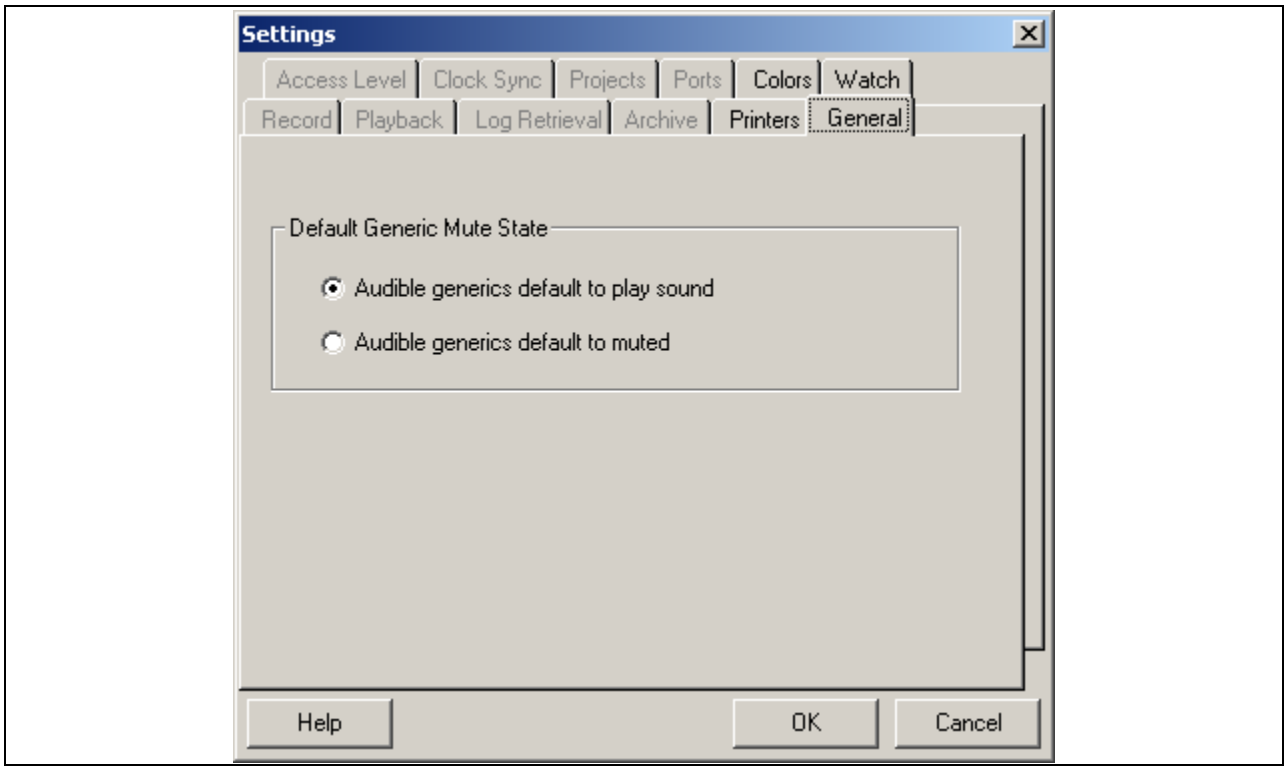


Figure 6–5. Main Screen Settings – General Tab

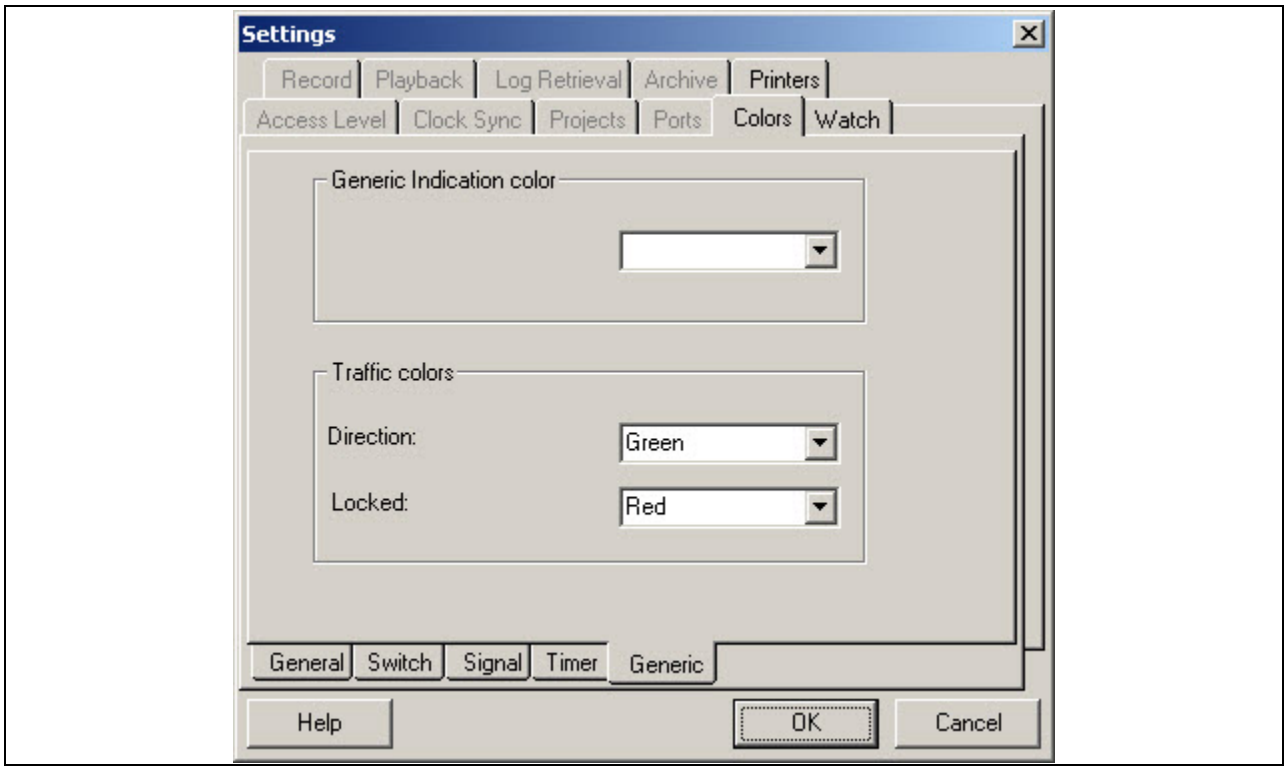


Figure 6–6. Main Screen Settings – Colors / Generic Tab

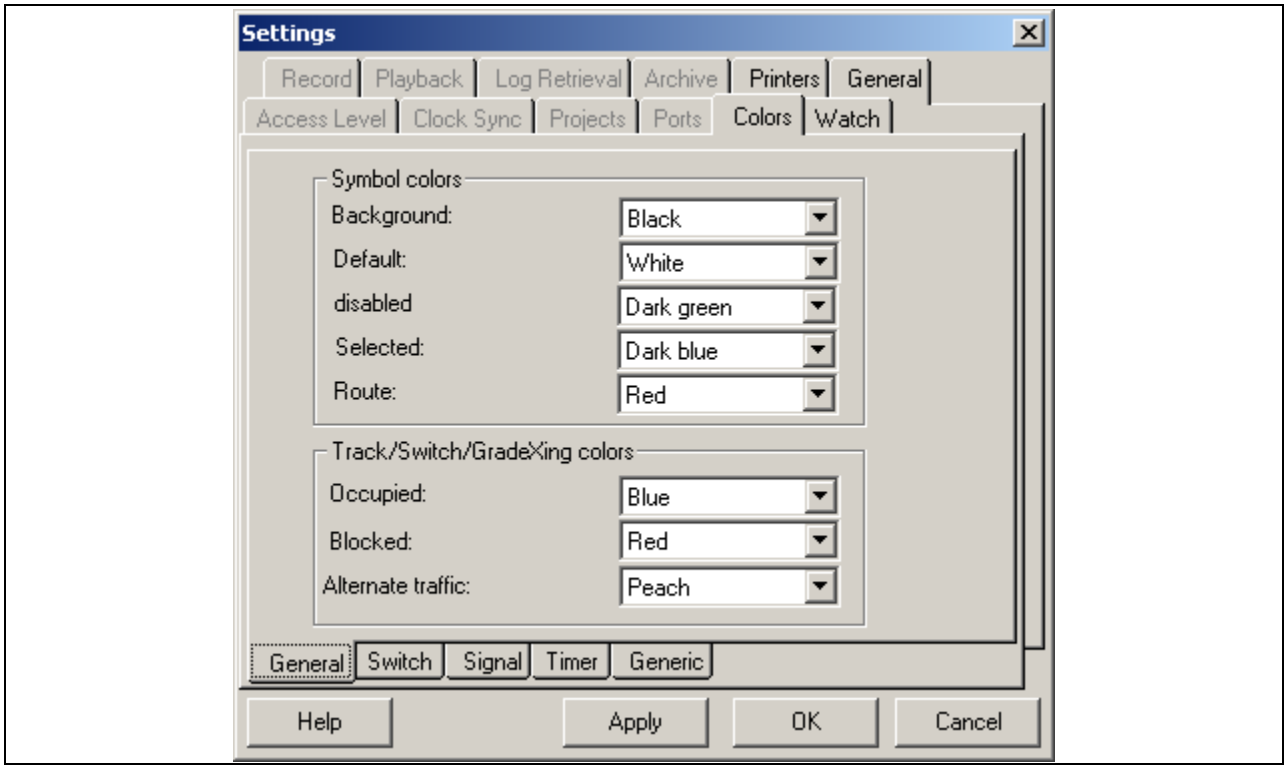


Figure 6–7. Main Screen Settings – Colors / General Tab

Table 6–3. Main Screen Settings Tabs

Tab	Description
General	Use this tab to set the default value for playing or muting sounds for audible generic symbols. See Figure 6–5.
Printers	Use this tab to select the default printer.
Colors	Use this tab to configure generic indication colors and traffic colors. See Figure 6–6 and Figure 6–7.
Watch	Use this tab to identify full names (format - system::application.variable) in Project Watch Window. (Short name is just the variable name). Since variables from multiple applications can be displayed, the use of short names may cause unexpected results if two or more applications have the same variable name; data for that variable name is updated for each application.

6.3.1.3 Help

To open the Help menu, click the ***Help*** button at the top of the MMS Main Screen. See Figure 6–8 and Table 6–4 for more information.

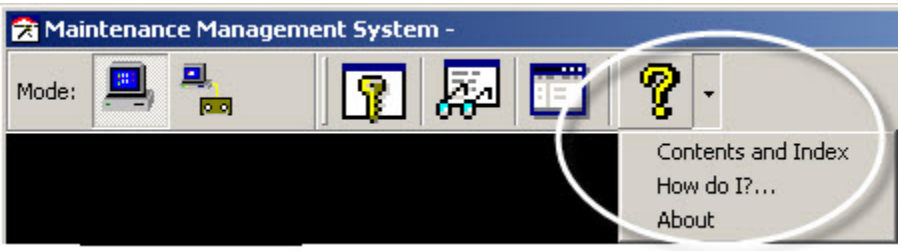


Figure 6–8. Main Screen Help Menu Button

Table 6–4. Main Screen Help Menu

Menu Item	Description
Contents and Index	Click to open the MMS help file. Clicking the **?** button also opens the MMS help file.
How do I?...	Click to open the How to… help file page.
About	Click to open the About window.

6.3.1.4 Control Systems

The Control Systems area is located in the lower left corner of the screen. See Figure 6–9 and Table 6–5 for more information.

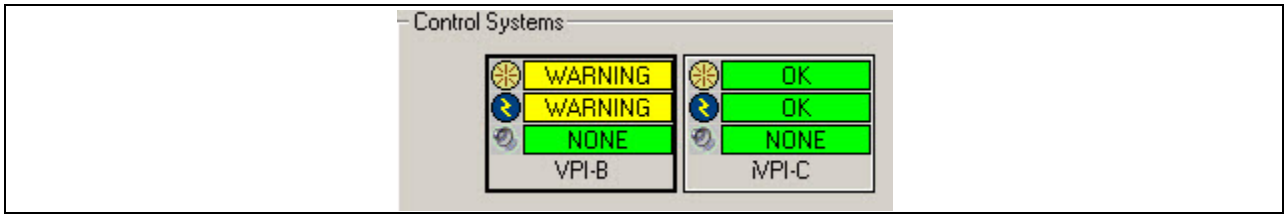


Figure 6–9. Main Screen Control Systems

Table 6–5. Main Screen Control System Status Indications

Indication	Status
Green Frame	Normal operation
Yellow Frame	Warning
Red Frame	Error
Blue Frame	Unknown

An unknown Control Systems status on startup is most likely due to an MMS Server port to VPI MAC port communication problem.

The active system is shown as depressed icon. The active system is used in the Maintenance Diagnostic, Application Explorer, Log Manager, Configuration Manager, and Communication Explorer screens.

6.3.1.5 Status Bar

The status bar displays important status information as an expandable text list. The last 50 items are displayed with their associated time stamps when the up arrow at the right of the bar is selected.

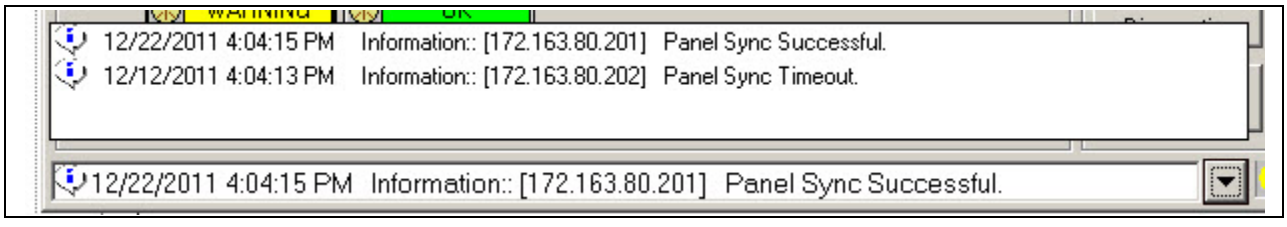

12/22/2011 4:04:15 PM Information:: [172.163.80.201] Panel Sync Successful.
12/12/2011 4:04:13 PM Information:: [172.163.80.202] Panel Sync Timeout.
12/22/2011 4:04:15 PM Information:: [172.163.80.201] Panel Sync Successful.

Figure 6–10. Main Screen Status Bar

6.3.1.6 Tools

The Tools area is located in the lower right corner of the screen and consists of buttons for each tool. See Figure 6–11 and Table 6–6 for more information.

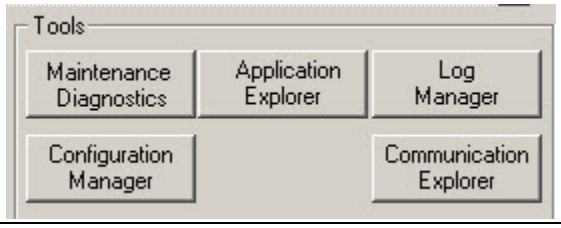


Figure 6–11. Main Screen Tools

Table 6–6. Main Screen Tools Descriptions

Tool	Description
Maintenance Diagnostics	The Maintenance Diagnostics tool provides a graphical display of control system hardware status and diagnostic data. See Section 6.3.2 for more information.
Application Explorer	The Application Explorer tool aids the troubleshooting of VPI systems by accessing variable data obtained through the diagnostic ports. See Section 6.3.3 for more information.
Log Manager	The Log Manager screen is used to handle the retrieval of VPI Data logs, archiving, selecting a playback source, and creating log reports. See Section 6.3.4 for more information.
Configuration Manager	The Configuration Manager tool provides reports of the expected and actual configuration items for each Application of the selected System. See Section 6.3.5 for more information.
Communication Explorer	The Communication Explorer – Network Statistics screen displays network statistics including number of received and transmitted messages, possible error counts, and nodes connected. See Section 6.3.6 for more information.

6.3.2 Maintenance Diagnostics

The Maintenance Diagnostics tool provides a graphical display of control system hardware status and diagnostic data. See Figure 6–12 and Table 6–7 for more information.

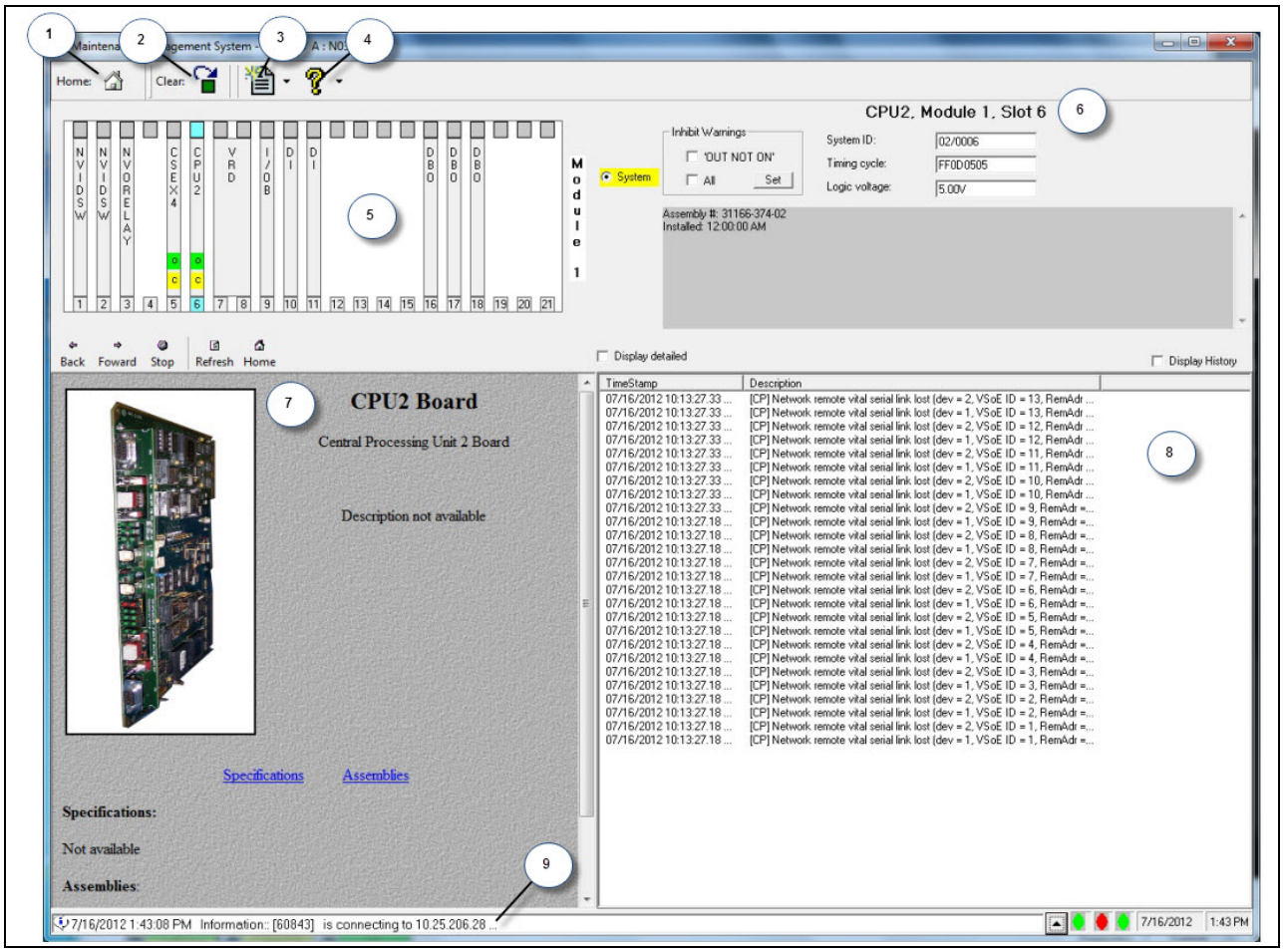


Figure 6–12. Maintenance Diagnostics Screen

Table 6–7. Maintenance Diagnostics Screen Interface

Callout	Description
1	Click the ***Home*** button to return to the Main Screen.
2	Click the ***Clear System Diagnostics*** button to send a clear diagnostics command to the associated control system.
3	Click the ***Edit*** button to modify selected board information or add log comments.
4	Click the ***Help*** button to open the MMS help system.
5	The Graphical Module Display shows the module layout. Individual board information and diagnostics is viewed by selecting the appropriate board. Board status is indicated as yellow for warning or red for error.
6	The Information Display displays the selected board and expanded Diagnostic information. Navigation is done through embedded links and/or the navigation keys.
7	The Board Information Display displays selected board information.
8	The Diagnostic Display displays the selected board diagnostics for this session. Check Display History to view all diagnostics for this board. Select the diagnostic statement to display expanded information.
9	The Status Bar displays MMS information as an expandable text list. The last 50 items are displayed with their associated time stamps when the up arrow on the right side of the bar is selected. Two icons show the selected System status (left) and the worst-case status of all Systems (right).

6.3.3 Application Explorer

WARNING

Application Explorer is a non-vital tool that displays the Boolean state of variables. Application Explorer must not be used for Vital breakdown testing or Vital verification of parameter values.

The Application Explorer tool aids the troubleshooting of VPI systems by accessing variable data obtained through the diagnostic ports. Multiple logic, message or I/O variables can be viewed in near real time. Variables are displayed using their assigned names and their current Boolean or integer values. Application logic statements can be displayed including the current values of the variables that comprise them.

See Figure 6–13 and Table 6–8 for more information.

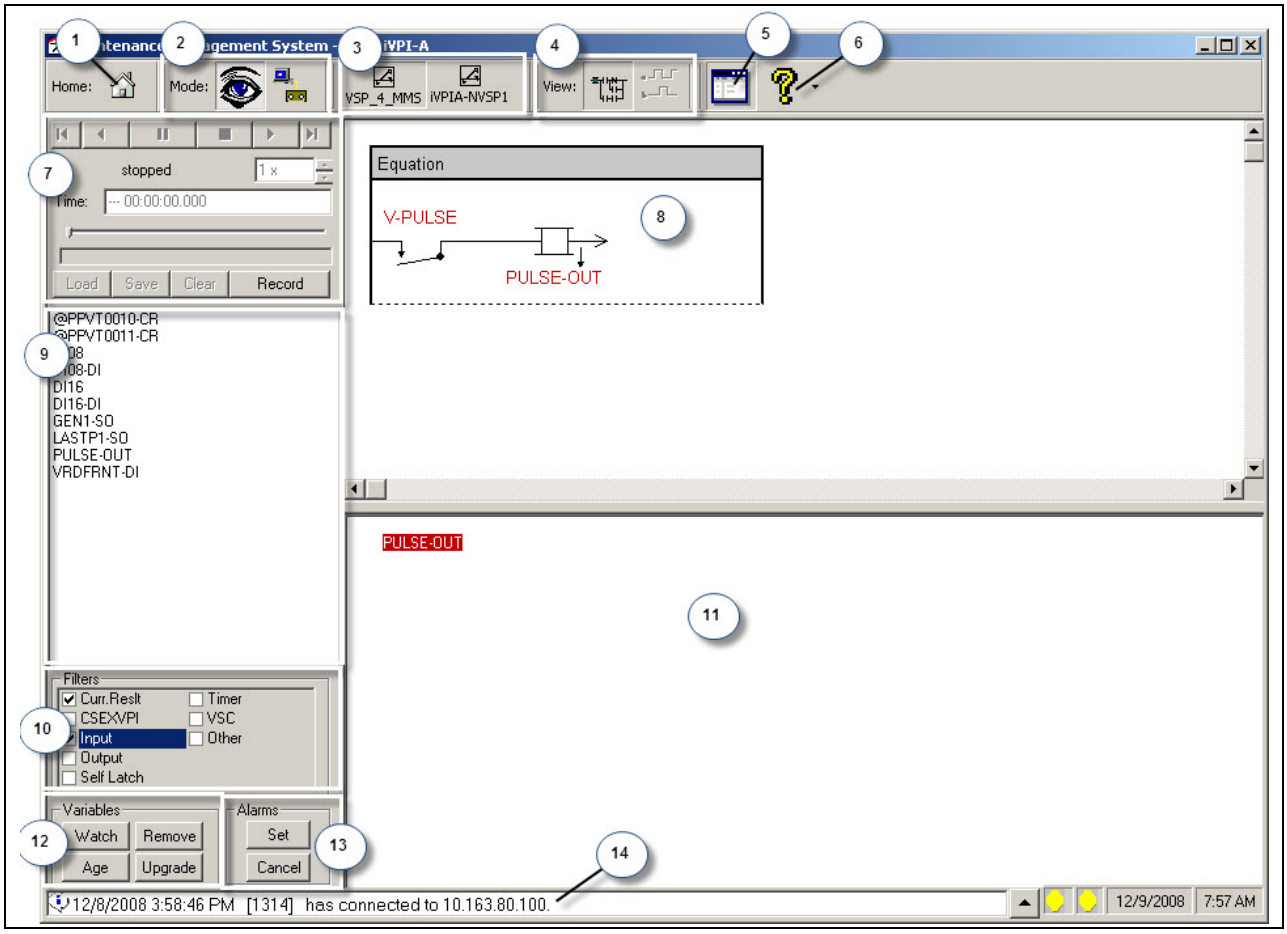


Figure 6–13. Application Explorer Screen

Table 6–8. Application Explorer Screen Interface

Callout	Description
1	Click the ***Home*** button to return to the Main Screen.
2	The Mode Tool Bar indicates whether Application Explorer is currently displaying real time data (***Runtime*** button) or playing recorded data (***Playback*** button).
3	The Application Tool Bar shows the applications in the active Control System. Click either button in the tool bar to make an application active.
4	The View Tool Bar indicates whether the Logic Window (***Equation View*** button) or Timing Window (***Timing View*** button) is displayed.
5	Click the ***Settings*** button to configure the Application Explorer screen.
6	Click the ***Help*** button to access the MMS online help file.
7	Use the Record/Playback controls to record variable values as they are received and save them to a Watch Log File. Playback can use Watch Log files or VPI Data Logs. All playback data is displayed as a timing diagram. • **Playback Record Button:** Click the ***Record*** button to record to a .txt file for playback. • **Load Button:** Click this button to load a previously saved Watch log file for playback. • **Save Button:** Click this button to save Application Explorer recorded data in a Watch log file. • **Clear Button:** Click this button to clear the buffer. • **Record Button:** Click this button to record Application Explorer data. Note: One Application's selected variable data can be recorded at a time. Recorded data is lost when switching to a new application. Note: If the Applications recorded data needs to be saved, then save it to a Watch Log file before switching to a new application.

Table 6–8. Application Explorer Screen Interface (Cont.)

Callout	Description
8	When the Equation icon on the Display tool bar is activated, the Logic window displays selected logic statements in text or graphical format. To view a logic statement that uses a particular variable, double click on the variable in the Watch Window. • If a logic statement using that variable is found, the statement is displayed in the Logic Window and a request for status updates on its variables is issued. The display of the variables in the statement is updated in the Logic Window as new status information is received. • Browse the logic statements and view their status in the Logic Window. See Limitations (below) for information on how much variable and logic statement data can be viewed at a time. The History (Timing) Window is in the same position as the Logic Window. When the Timing icon on the Display tool bar is activated, this window displays a timing diagram of recorded data during playback.
9	The Variables List displays variables available for adding to the Watch Window. Variables are filtered by type. Select one or more variables and add them to the Watch Window. Status updates are requested on the added variables. Their display in the Watch Window is updated as new status information is received.
10	The Filters List displays the types of variables in the current application. The variable types that are checked in the Filters List determine the contents of the Variables List. The Filters List contains icons to Add (Watch), Remove, Age, or Upgrade the variables list.
11	The Watch Window displays selected variables whose values are being monitored. The Watch Window also provides an options menu available by right-clicking in the Watch Window area. See Table 6–9 for more information.

Table 6–8. Application Explorer Screen Interface (Cont.)

Callout	Description
12	The Variables Tool Bar is used to watch, age, remove, and upgrade variables. Limitations for these variables include: • Watch Variables for CSEX Applications using serial connections have a maximum of 64 Boolean and 4 integer watch variables, including variables visible in the Watch Window as well as temporary logic statement variables. • Watch Variables for CSEX/NVSP Applications using network connections have a maximum of 128 watch variables, including variables visible in the Watch Window as well as temporary logic statement variables. Variables can be a mix of either Boolean or Integer. – MMS is unable to monitor subroutine arguments that are passed by address rather than by value. – MMS is unable to monitor array variables with a calculated index. • Watch Variables for CPU/PD, CPU II, VSP using serial connections have maximums defined in Table 3–1 that include variables visible in the Watch Window as well as temporary logic statement variables. • Watch Variables for CPU II/VSP using network connections have a maximum of 128 Boolean watch variables, including variables visible in the Watch Window as well as temporary logic statement variables. – MMS is unable to handle Vital output state variables because they do not have normal true or false values.
13	The Alarms tool bar has buttons to Set or Cancel posted alarms.
14	The Status Bar displays MMS information as an expandable text list. The last 50 items are displayed with their associated time stamps. Two icons show the selected System status (left) and the worst-case status of all Systems (right).

To access the Watch Window options menu, right-click in the Watch Window area. The options menu opens. See Figure 6–14.

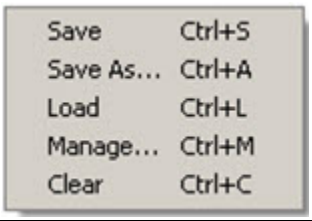


Figure 6–14. Watch Window Options Menu

See Table 6–9 for descriptions of each option.

Table 6–9. Watch Window Options Menu Descriptions (

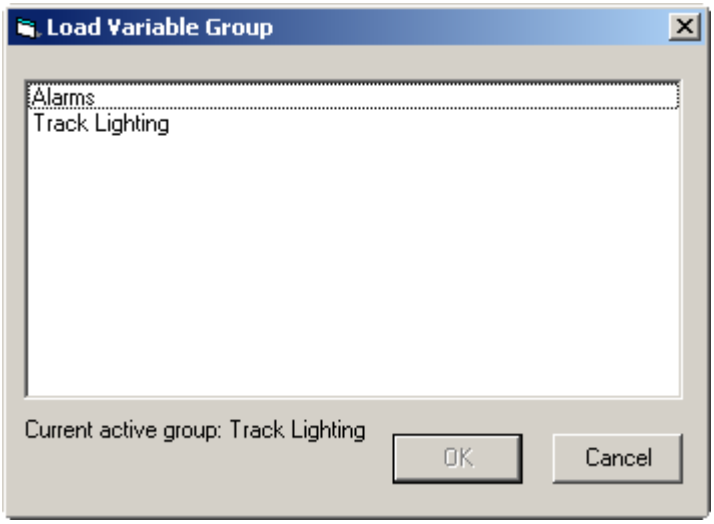
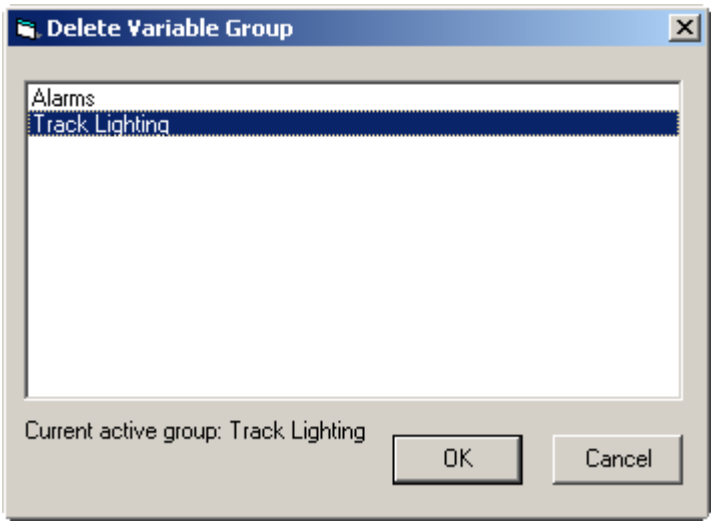
Option	Description
Save	Select this option to save the variable group that is currently loaded in the Watch Window.
Save As	Select this option to save the variable group that is currently loaded in the Watch Window using a different name.
Load	Select this option to open a window with an alphabetized list of available variable groups.  Select a group to load and click the ***OK*** button. MMS loads the selected variable group into the Watch Window.

Table 6–9. Watch Window Options Menu Descriptions (Cont.)

Option	Description
Manage	Select this option to open a window with an alphabetized list of available variable groups.  Select a variable group to delete and click the ***OK*** button. The selected variable group is deleted.
Clear	Select this option to clear the Watch Window of all loaded variables. All variable groups are also made inactive.

To configure the Application Explorer Screen, click the ***Preferences*** button. The Settings window opens. The Settings Window consists of four tabs. See Table 6–10 for descriptions of each tab.

Table 6–10. Application Explorer Screen Settings Tabs

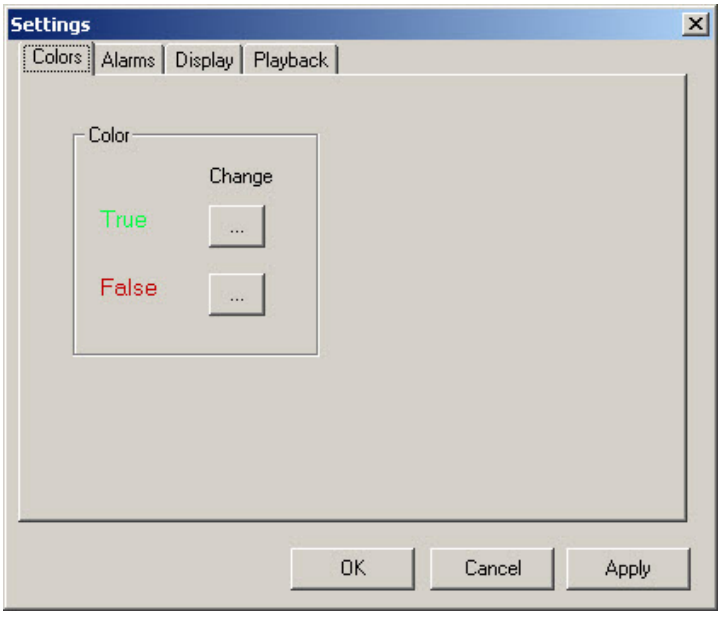
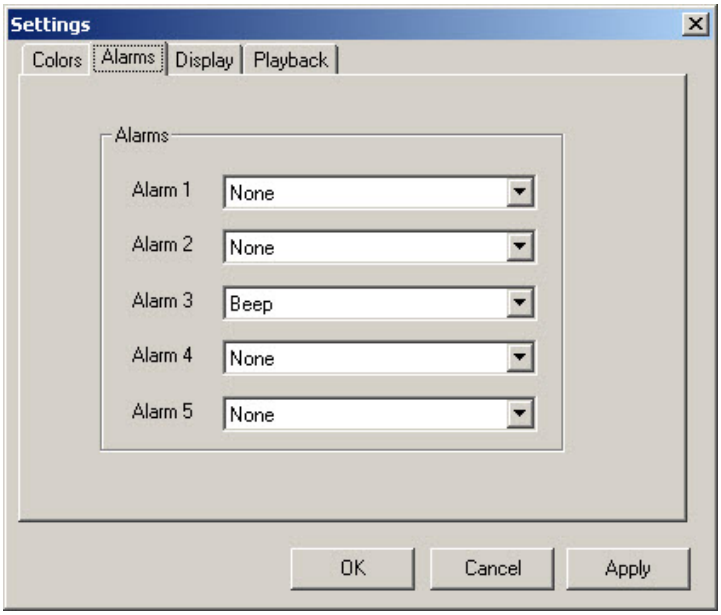
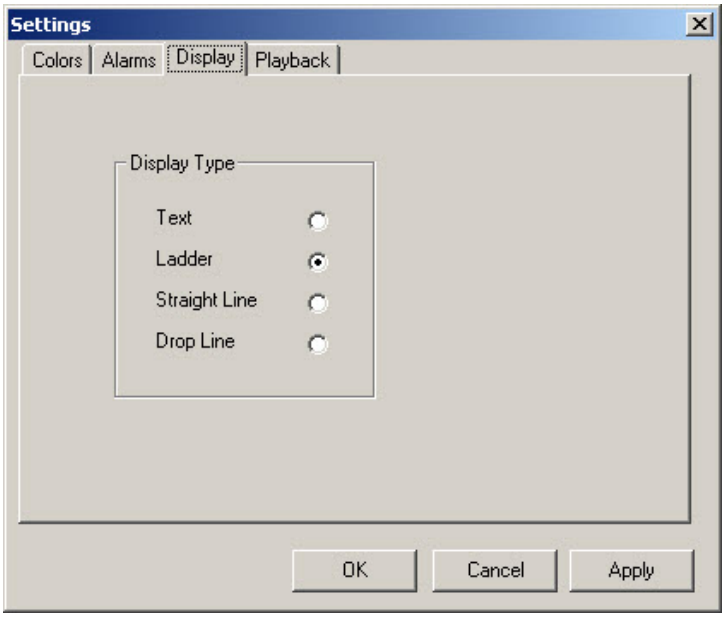
Tab	Description
Colors	This tab controls the color of True or False Boolean variables displayed in the Watch Window and the Logic Window. 

Table 6–10. Application Explorer Screen Settings Tabs (Cont.)

Tab	Description
Alarms	This tab controls the .wav files (sound) that are played when an alarm is sounded. 
Display	This tab controls the display format of logic statements in the Logic Window. Text format and three graphical formats (ladder, straight line, drop line) are available. 

6.3.4 Log Manager

The Log Manager screen is used to handle the retrieval of VPI Data logs, archiving, selecting a playback source, and creating log reports. See Figure 6–15 and Table 6–11 for more information.

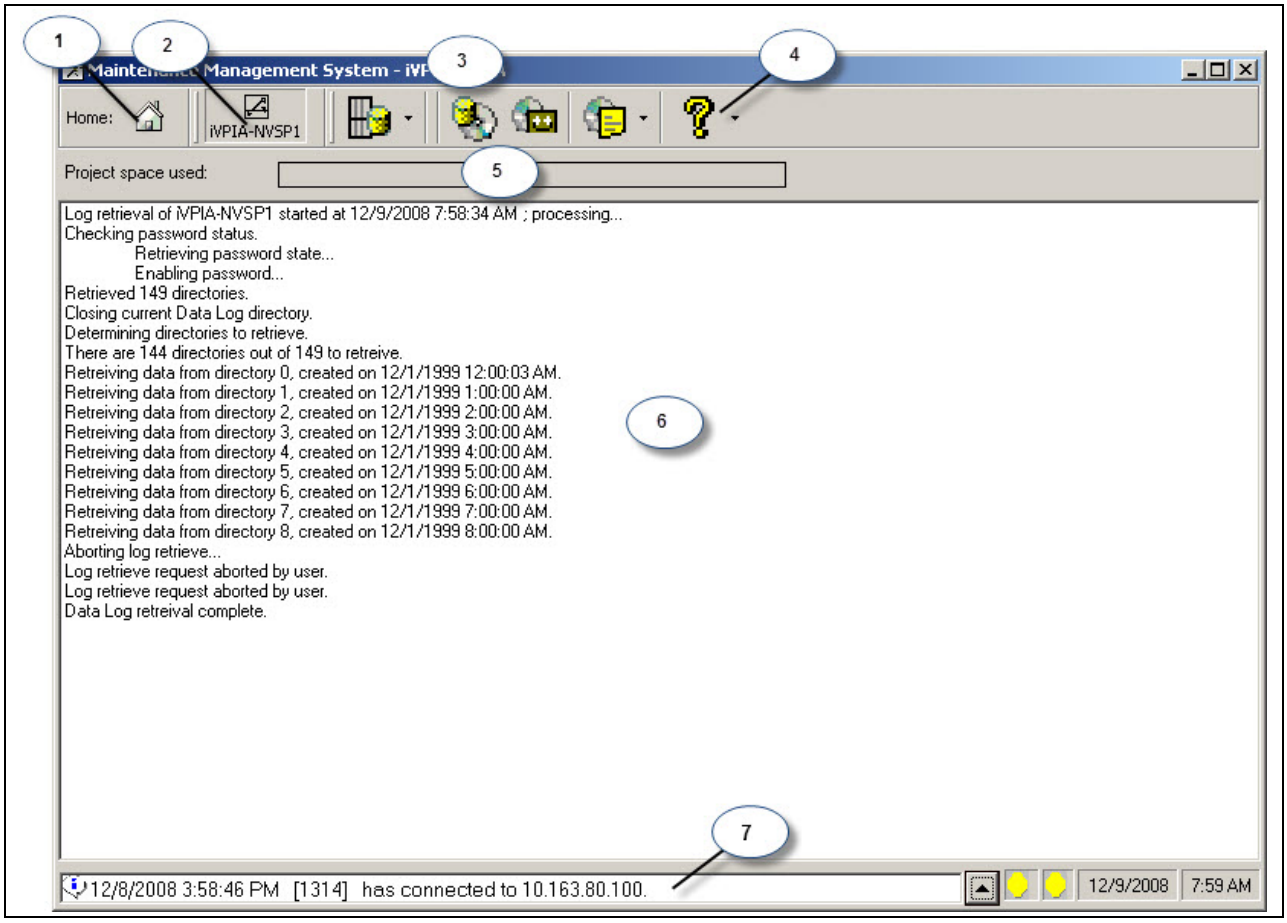
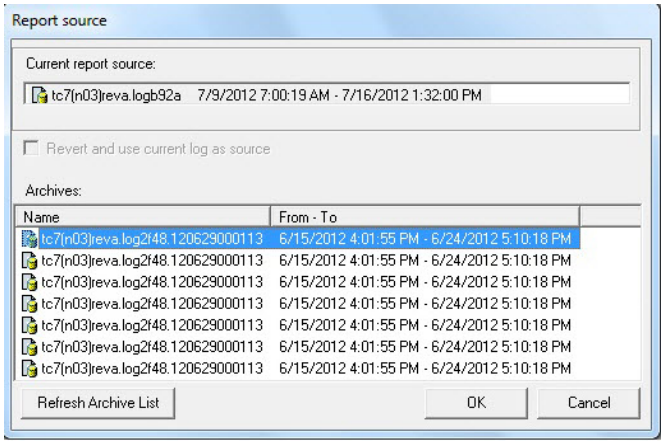

1
2
3
4
5
6
7
Home:
iVPIA-NVSP1
Project space used:
Log retrieval of iVPIA-NVSP1 started at 12/9/2008 7:58:34 AM ; processing...
Checking password status.
Retrieving password state...
Enabling password...
Retrieved 149 directories.
Closing current Data Log directory.
Determining directories to retrieve.
There are 144 directories out of 149 to retreive.
Retreiving data from directory 0, created on 12/1/1999 12:00:03 AM.
Retreiving data from directory 1, created on 12/1/1999 1:00:00 AM.
Retreiving data from directory 2, created on 12/1/1999 2:00:00 AM.
Retreiving data from directory 3, created on 12/1/1999 3:00:00 AM.
Retreiving data from directory 4, created on 12/1/1999 4:00:00 AM.
Retreiving data from directory 5, created on 12/1/1999 5:00:00 AM.
Retreiving data from directory 6, created on 12/1/1999 6:00:00 AM.
Retreiving data from directory 7, created on 12/1/1999 7:00:00 AM.
Retreiving data from directory 8, created on 12/1/1999 8:00:00 AM.
Aborting log retrieve...
Log retrieve request aborted by user.
Log retrieve request aborted by user.
Data Log retreival complete.
12/8/2008 3:58:46 PM [1314] has connected to 10.163.80.100.
12/9/2008
7:59 AM

Figure 6–15. Log Manager Screen

Table 6–11. Log Manager Screen Interface

Callout	Description
1	Click the ***Home*** button to return to the Main Screen.
2	The Application Tool Bar displays the active System's Applications that have associated Data Log ports. Select an Application to retrieve its logs.
3	The Action Tool Bar contains the following buttons: • **Retrieve Button:** Click to retrieve the selected Application's data log. All log data is saved in the MMS project data base file (located in the Apps folder). Previously retrieved data is skipped; only new data is retrieved. The selected Application's log date, time and version can also be retrieved. • **Archive Button:** Click to archive (copy) the project data base file into the Archive folder. The project log data can optionally be cleared once the archive is complete. • **Report Source Button:** Click to select a database from which to generate reports. Archive databases can also be selected.  • **Reports Button:** Click to create data log and MMS event log reports. Reports can be saved in text, rich text and comma separated value formats.
4	Click the ***Help*** button to access the MMS online help file.
5	The Project Space Used indicates the amount of space used by the current MMS log file. The maximum limit is 1 GB or the amount of hard drive space available, whichever is less.
6	The Report Display Area displays text describing the retrieval process status.
7	The Status Bar displays MMS information as an expandable text list. The last 50 items are displayed with their associated time stamps. Two icons show the selected System status (left) and the worst-case status of all Systems (right).

6.3.5 Configuration Manager

The Configuration Manager tool provides reports of the expected and actual configuration items for each Application of the selected System. Both hardware and firmware items can be reported. See Figure 6–16 and Table 6–12 for more information.

Figure 6–16. Configuration Manager Screen

Table 6–12. Configuration Manager Screen Interface

Callout	Description
1	Click the ***Home*** button to return to the Main Screen.
2	Use the Validate button to validate expected hardware and firmware versions. • **Firmware:** For Applications, this icon reports the expected and actual firmware configuration items for each Application of the selected System. • **Hardware:** For Hardware, this icon reports the expected and actual (if supported) hardware configuration items for each Application of the selected System.
3	Click the ***Save*** button to save the report in rich text format (.rtf).
4	Click the ***Print*** button to send the report to the default printer.
5	Click the ***Help*** button to access the MMS online help file.
6	The Report display window displays the configuration reports.
7	The Status Bar displays MMS information as an expandable text list. The last 50 items are displayed with their associated time stamps. Two icons show the selected System status (left) and the worst-case status of all Systems (right).

6.3.6 Network Statistics Screen

The Communication Explorer – Network Statistics screen displays network statistics including number of received and transmitted messages, possible error counts, and nodes connected. Statistics can be cleared and updated by using the **Clear** and **Refresh** buttons.

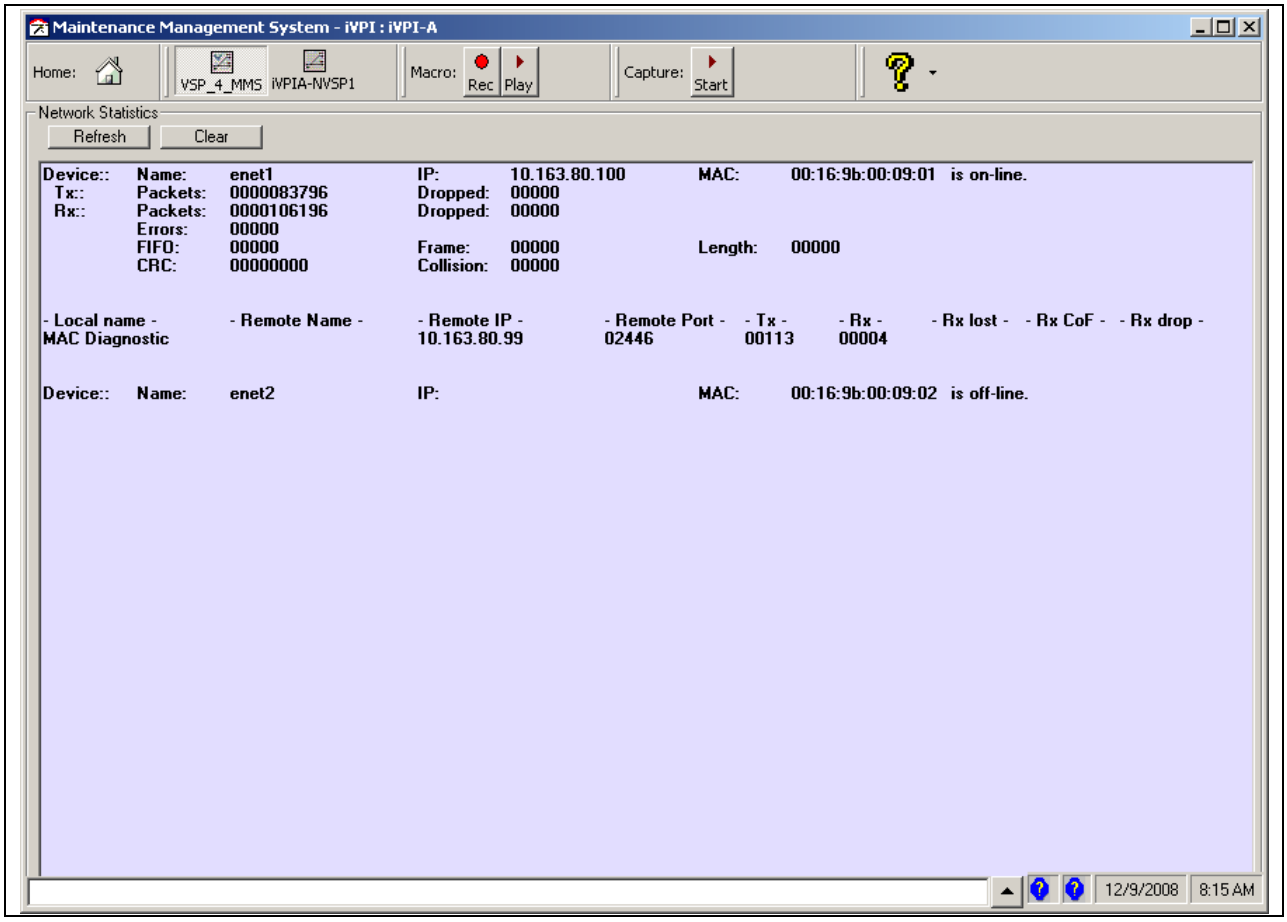

Maintenance Management System - iVPI : iVPI-A
Home:
VSP_4_MMS
iVPIA-NVSP1
Macro:
Rec
Play
Capture:
Start
Network Statistics
Refresh
Clear
Device:: Name: enet1 IP: 10.163.80.100 MAC: 00:16:9b:00:09:01 is on-line.
Tx:: Packets: 0000083796 Dropped: 00000
Rx:: Packets: 0000106196 Dropped: 00000
Errors: 00000
FIFO: 00000 Frame: 00000 Length: 00000
CRC: 00000000 Collision: 00000
- Local name - - Remote Name - - Remote IP - - Remote Port - - Tx - - Rx - - Rx lost - - Rx CoF - - Rx drop -
MAC Diagnostic 10.163.80.99 02446 00113 00004
Device:: Name: enet2 IP: MAC: 00:16:9b:00:09:02 is off-line.
12/9/2008
8:15 AM

Figure 6–17. Communication Explorer – Network Statistics Screen

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SECTION 7 – SYMBOLS

7.1 OVERVIEW

This section describes the symbols used in MMS layout configuration.

Each symbol has a tool bar icon used to select the symbol and an associated image (symbol) that appears on the layout screen.

7.2 TRACK SYMBOLS

7.2.1 Overlay Track

Use this symbol to indicate overlay track circuits (typically placed over other tracks/switches).

- Toolbar Icon:
- Symbol Image:

Table 7–1. Overlay Track Symbol Attributes

Attribute	Description	User Defined	Possible Entries	Default
Symbol ID	ID number of the symbol	No		Set By Application
Overlaid Symbols	Tracks/Switches associated with this track	No		
Type	Type of Track	No		Overlay
Label	Text label of symbol	Yes	Any Text (128 char. max)	Symbol ID + "TR"
Loss of Shunt Delay	Time to wait after loss of shunt	Yes	hh:mm:ss.ms	00:00:00.000
Cab Signal	Allow cab signal display	Yes	Enabled, Disabled	Disabled
Label Location	Location of symbol label	Yes	Top, Bottom, Left, Right, Center	Bottom
Description	Optional text description	Yes	Optional, Any Text (255 char. max)	""

Parameters – Controls

None

Table 7–2. Overlay Track Symbol Parameters – Indications

Parameter	State	Description
TRACK_STATUS	OCCUPIED	Indicates track occupancy If set track color = occupied Otherwise color = default
TRACK_STATUS	BLOCKED	Indicates a track is blocked from traffic If set track color = blocked OCCUPIED overrides BLOCKED
TRACK_ROUTE	LOCKED	Indicates the track is part of a locked route If set track color = route
TRACK_ROUTE	POSSIBLE	Indicates the track is an Entry or Exit point If set and Entry/Exit is Yes a mid-section of the track color = route TRACK_STATUS overrides TRACK_ROUTE
CAB_RATE (if enabled)	RATE_1 through RATE_7	Indicates cab signal rate Rate index is displayed as [index] * indicates invalid index

7.2.2 Non-Coded Track

Use this symbol to indicate track circuits without codes.

- Toolbar Icon:
- Symbol Image:

Table 7–3. Non-Coded Track Symbol Attributes

Attribute	Description	User Defined	Possible Entries	Default
Symbol ID	ID number of the symbol	No		Set By Application
Overlay Tracks	Overlay tracks associated with this track	No		
Neighbor-Head	Symbol linked to the head end of this track	No		
Neighbor-Tail	Symbol linked to the tail end of this track	No		
Signal Link - Head	Symbol linked to the head end of this signal	No		
Signal Link - Tail	Symbol linked to the tail end of this signal	No		
Label	Text label of symbol	Yes	Any Text (128 char. max)	Symbol ID + "TR"
Type	Type of Track	Yes	AC No Code, DC No Code	DC No Code
Loss of Shunt Delay	Time to wait after loss of shunt	Yes	hh:mm:ss.ms	00:00:00.000
Cab Signal	Allow cab signal display	Yes	Enabled, Disabled	Disabled
Entry/Exit	Allow use as entry/exit track	Yes	Yes, No	No

Table 7–3. Non-Coded Track Symbol Attributes (Cont.)

Attribute	Description	User Defined	Possible Entries	Default
Label Location	Location of symbol label	Yes	Top, Bottom, Left, Right, Center	Bottom
Description	Optional text description	Yes	Optional, Any Text (255 char. max)	""

Table 7–4. Non-Coded Track Symbol Parameters – Controls

Parameter	State	Description
ENTRY_EXIT_CALL (if enabled)	ENTRY	Request track as entry point in NX operation
ENTRY_EXIT_CALL (if enabled)	EXIT	Request track as exit point in NX operation

Table 7–5. Non-Coded Track Symbol Parameters – Indications

Parameter	State	Description
TRACK_STATUS	OCCUPIED	Indicates track occupancy If set track color = occupied Otherwise color = default
TRACK_STATUS	BLOCKED	Indicates a track is blocked from traffic If set track color = blocked OCCUPIED overrides BLOCKED
TRACK_ROUTE	LOCKED	Indicates the track is part of a locked route If set track color = route
TRACK_ROUTE	POSSIBLE	Indicates the track is an Entry or Exit point If set and Entry/Exit is Yes a mid-section of the track color = route TRACK_STATUS overrides TRACK_ROUTE
CAB_RATE (if enabled)	RATE_1 through RATE_7	Indicates cab signal rate Rate index is displayed as [index] * indicates invalid index

7.2.3 Coded Track

Use this symbol to indicate coded track circuits.

- Toolbar Icon:
- Symbol Image:

Table 7–6. Coded Track Symbol Attributes

Attribute	Description	User Defined	Possible Entries	Default
Symbol ID	ID number of the symbol	No		Set By Application
Overlay Tracks	Overlay tracks associated with this track	No		
Neighbor-Head	Symbol linked to the head end of this track	No		
Neighbor-Tail	Symbol linked to the tail end of this track	No		
Signal Link - Head	Symbol linked to the head end of this signal	No		
Signal Link - Tail	Symbol linked to the tail end of this signal	No		
Label	Text label of symbol	Yes	Any Text (128 char. max)	Symbol ID + "TR"
Type	Type of Track	Yes	AC Coded, DC Coded	DC Coded
Loss of Shunt Delay	Time to wait after loss of shunt	Yes	hh:mm:ss.ms	00:00:00.000
Cab Signal	Allow cab signal display	Yes	Enabled, Disabled	Disabled
Entry/Exit	Allow use as entry/exit track	Yes	Yes, No	No

Table 7–6. Coded Track Symbol Attributes (Cont.)

Attribute	Description	User Defined	Possible Entries	Default
Label Location	Location of symbol label	Yes	Top, Bottom, Left, Right, Center	Bottom
Description	Optional text description	Yes	Optional, Any Text (255 char. max)	""

Table 7–7. Coded Track Symbol Parameters – Controls

Parameter	State	Description
ENTRY_EXIT_CALL (if enabled)	ENTRY	Request track as entry point in NX operation
ENTRY_EXIT_CALL (if enabled)	EXIT	Request track as exit point in NX operation

Table 7–8. Coded Track Symbol Parameters – Indications

Parameter	State	Description
TRACK_STATUS	OCCUPIED	Indicates track occupancy If set track color = occupied Otherwise color = default
TRACK_STATUS	BLOCKED	Indicates a track is blocked from traffic If set track color = blocked OCCUPIED overrides BLOCKED
TRACK_ROUTE	LOCKED	Indicates the track is part of a locked route If set track color = route
TRACK_ROUTE	POSSIBLE	Indicates the track is an Entry or Exit point If set and Entry/Exit is Yes a mid-section of the track color = route TRACK_STATUS overrides TRACK_ROUTE
EAST/WEST CODES	CODE_1 through CODE_9	Indicates track codes EAST CODES displayed as: code-list >> WEST CODES displayed as: << code-list ? indicates unknown code
CAB_RATE (if enabled)	RATE_1 through RATE_7	Indicates cab signal rate Rate index is displayed as: [index] * indicates invalid index

7.3 SWITCH SYMBOLS

Use the following symbols to indicate switches.

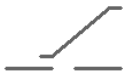
- Toolbar Icons:
  - (NE = Northeast)
  - (SE = Southeast)
  - (NW = Northwest)
  - (SW = Southwest)
- Symbol Image: 

Table 7–9. Switch Symbol Attributes (

Attribute	Description	User Defined	Possible Entries	Default
Symbol ID	ID number of the symbol	No		Set By Application
Alignment	Alignment of switch	No		
Overlay Tracks	Overlay tracks associated with this switch	No		
Neighbor-Facing	Symbol linked to the facing end of this switch	No		
Neighbor-Trailing	Symbol linked to the trailing end of this switch	No		
Neighbor-Reverse	Symbol linked to the reverse end of this switch	No		
Signal Link - Facing	Symbol linked to the facing end of this signal	No		
Signal Link – Trailing	Symbol linked to the trailing end of this signal	No		
Label	Text label of symbol	Yes	Any Text (128 char. max)	Symbol ID + "SW"

Table 7–9. Switch Symbol Attributes (Cont.)

Attribute	Description	User Defined	Possible Entries	Default
Type	Type of Switch	Yes	Generic	Generic
Switch Delay	Time to wait for switch operation	Yes	hh:mm:ss.ms	00:00:00.000
Label Location	Location of symbol label	Yes	Top, Bottom, Left, Right, Center	Center
Description	Optional text description	Yes	Optional, Any Text (255 char. max)	""

Table 7–10. Switch Symbol Parameters – Controls

Parameter	State	Description
POSITION_CALL	NORMAL	Request switch position to normal
POSITION_CALL	REVERSE	Request switch position to reverse
POSITION_CALL	AUTOMATIC	Request application to determine switch position based on routing

Table 7–11. Switch Symbol Parameters – Indications

Parameter	State	Description
POSITION	NORMAL	Indicates switch position is normal (facing end to trailing end solid line)
POSITION	REVERSE	Indicates switch position is reverse (facing end to reverse end solid line)
CONTROL	NORMAL	Indicates switch is going normal
CONTROL	REVERSE	Indicates switch is going reverse
LOCK_STATUS		Indicates switch locking If locked displays "L" in locked color Otherwise displays "U" in default color
REQUEST_STATUS	PENDING	Indicates position call is pending Switch flashes in direction of CONTROL If CONTROL is unknown entire switch flashes
REQUEST_STATUS	FAILED	Indicates position call has failed

7.4 LIGHT SYMBOLS

7.4.1 Color Lights

Use the following symbols to indicate color lights.

- Toolbar Icons:
  - (E = East)
  - (W = West)
- Symbol Image:

Table 7–12. Color Light Symbol Attributes

Attribute	Description	User Defined	Possible Entries	Default
Symbol ID	ID number of the symbol	No		Set By Application
Alignment	East/West alignment	No		
Signal Link		No		
Type	Type of signal	No		Color Light
Label	Text label of symbol	Yes	Any Text (128 char. max)	Symbol ID + "CL"
Label Location	Location of symbol label	Yes	Top, Bottom, Left, Right	Bottom (East), Top (West)
Characteristic		Yes	Single-head, 3 Color LED None Home Approach	Single-head, 3 Color LED
Head (A/B/C)	Enable up to three heads per Color light	Yes	Enabled, Disabled	A-Enabled B/C-Disabled
Flashing	Enable flashing for this head	Yes	Enabled, Disabled	Disabled
Flash Rate	Flash rate for this head	Yes	0, 40,45,50,55,60,65	0
Red Aspect	Enable Red aspect for this head	Yes	Enabled, Disabled	Enabled

Table 7–12. Color Light Symbol Attributes (Cont.)

Attribute	Description	User Defined	Possible Entries	Default
Yellow Aspect	Enable Yellow aspect for this head	Yes	Enabled, Disabled	Enabled
Green Aspect	Enable Green aspect for this head	Yes	Enabled, Disabled	Enabled
Lunar Aspect	Enable Lunar aspect for this head	Yes	Enabled, Disabled	Disabled
Track Select Aspect	Enable Track Select aspect for this head	Yes	Enabled, Disabled	Disabled
Description	Optional text description	Yes	Optional, Any Text (255 char. max)	""

Table 7–13. Color Light Symbol Parameters – Controls

Parameter	State	Description
ASPECT_CALL	CANCEL	Remove the request of permissive signal call
ASPECT_CALL	CALL	Request for signal
ASPECT_CALL	CALL_ON	Request signal for move into occupied territory
ASPECT_CALL	FLEET	Reclear signal to allow following moves

Table 7–14. Color Light Symbol Parameters – Indications

Parameter	State	Description
ACTIVE_ASPECT	(head)_ (aspect color)	Indicates aspect color for each head
ASPECT_STATUS	(head)_ (aspect color)_ OPEN	Indicates the filament status
FLEET		Indicates fleeting enabled If fleeted displays "F" in fleet color Otherwise no "F" displayed
REQUEST_STATUS	PENDING	Indicates signal call is pending If pending signal border = pending color
REQUEST_STATUS	FAILED	Indicates signal call has failed If failed signal border = failed color

7.4.2 Position Lights

Use the following symbols to indicate position lights.

- Toolbar Icons:
  - (E = East)
  - (W = West)

Symbol Image:

Table 7–15. Position Light Symbol Attributes

Attribute	Description	User Defined	Possible Entries	Default
Symbol ID	ID number of the symbol	No		Set By Application
Alignment	East/West alignment	No		
Signal Link		No		
Type	Type of signal	No		PositionLight
Label	Text label of symbol	Yes	Any Text (128 char. max)	Symbol ID + "PL"
Characteristic		Yes	Single-head, 3 Color LED None Home Approach	Single-head, 3 Color LED
Head (A/B/C)	Enable up to three heads per Position light	Yes	Enabled, Disabled	A-Enabled B/C-Disabled
Flashing	Enable flashing for this head	Yes	Enabled, Disabled	Disabled
Flash Rate	Flash rate for this head	Yes	0, 40,45,50,55,60,65	0
Red Aspect	Enable Red aspect for this head	Yes	Enabled, Disabled	Enabled
Yellow Aspect	Enable Yellow aspect for this head	Yes	Enabled, Disabled	Enabled

Table 7–15. Position Light Symbol Attributes (Cont.)

Attribute	Description	User Defined	Possible Entries	Default
Green Aspect	Enable Green aspect for this head	Yes	Enabled, Disabled	Enabled
Lunar Aspect	Enable Lunar aspect for this head	Yes	Enabled, Disabled	Disabled
Track Select Aspect	Enable Track Select aspect for this head	Yes	Enabled, Disabled	Disabled
Label Location	Location of symbol label	Yes	Top, Bottom, Left, Right	Bottom (East), Top (West)
Description	Optional text description	Yes	Optional, Any Text (255 char. max)	""

Table 7–16. Position Light Symbol Parameters – Controls

Parameter	State	Description
ASPECT_CALL	CANCEL	Remove the request of permissive signal call
ASPECT_CALL	CALL	Request for signal
ASPECT_CALL	CALL_ON	Request signal for move into occupied territory
ASPECT_CALL	FLEET	Reclear signal to allow following moves

Table 7–17. Position Light Symbol Parameters – Indications

Parameter	State	Description
ACTIVE_ASPECT	(head)_ (aspect color)	Indicates aspect color for each head
ASPECT_STATUS	(head)_ (aspect color)_ OPEN	Indicates the filament status
FLEET		Indicates fleeting enabled If fleeted displays "F" in fleet color Otherwise no "F" displayed
REQUEST_STATUS	PENDING	Indicates signal call is pending If pending signal border = pending color
REQUEST_STATUS	FAILED	Indicates signal call has failed If failed signal border = failed color

7.4.3 Search Lights

Use the following symbols to indicate search lights.

- Toolbar Icons:
  - (E = East)
  - (W = West)
- Symbol Image:

Table 7–18. Search Light Symbol Attributes

Attribute	Description	User Defined	Possible Entries	Default
Symbol ID	ID number of the symbol	No		Set By Application
Alignment	East/West alignment	No		
Signal Link		No		
Label	Text label of symbol	Yes	Any Text (128 char. max)	Symbol ID + "SL"
Type	Type of signal	No		Search Light
Characteristic		Yes	Single-head, 3 Color LED None Home Approach	Single-head, 3 Color LED
Mech Delay	Time delay for search light mechanism operation	Yes	hh:mm:ss.ms	00:00:00.000
Head (A/B/C)	Enable up to three heads per Search light	Yes	Enabled, Disabled	A-Enabled B/C-Disabled
Flashing	Enable flashing for this head	Yes	Enabled, Disabled	Disabled
Flash Rate	Flash rate for this head	Yes	0, 40,45,50,55,60,65	0
Red Aspect	Enable Red aspect for this head	Yes	Enabled, Disabled	Enabled

Table 7–18. Search Light Symbol Attributes (Cont.)

Attribute	Description	User Defined	Possible Entries	Default
Yellow Aspect	Enable Yellow aspect for this head	Yes	Enabled, Disabled	Enabled
Green Aspect	Enable Green aspect for this head	Yes	Enabled, Disabled	Enabled
Lunar Aspect	Enable Lunar aspect for this head	Yes	Enabled, Disabled	Disabled
Track Select Aspect	Enable Track Select aspect for this head	Yes	Enabled, Disabled	Disabled
Label Location	Location of symbol label	Yes	Top, Bottom, Left, Right	Bottom (East), Top (West)
Description	Optional text description	Yes	Optional, Any Text (255 char. max)	""

Table 7–19. Search Light Symbol Parameters – Controls

Parameter	State	Description
ASPECT_CALL	CANCEL	Remove the request of permissive signal call
ASPECT_CALL	CALL	Request for signal
ASPECT_CALL	CALL_ON	Request signal for move into occupied territory
ASPECT_CALL	FLEET	Reclear signal to allow following moves

Table 7–20. Search Light Symbol Parameters – Indications

Parameter	State	Description
ACTIVE_ASPECT	(head)_ (aspect color)	Indicates aspect color for each head
ASPECT_STATUS	(head)_OPEN	Indicates the filament status
REPEATER_STATUS	(head)_ (aspect color)	Indicates repeater status for each aspect of each head
FLEET		Indicates fleeting enabled If fleeted displays "F" in fleet color Otherwise no "F" displayed
REQUEST_STATUS	PENDING	Indicates signal call is pending If pending signal border = pending color
REQUEST_STATUS	FAILED	Indicates signal call has failed If failed signal border = failed color

7.4.4 Semaphore Lights

Use the following symbols to indicate semaphore lights.

- Toolbar Icons:
  - (E = East)
  - (W = West)
- Symbol Image:

Table 7–21. Semaphore Light Symbol Attributes

Attribute	Description	User Defined	Possible Entries	Default
Symbol ID	ID number of the symbol	No		Set By Application
Alignment	East/West alignment	No		
Signal Link		No		
Type	Type of signal	No		Semaphore Light
Label	Text label of symbol	Yes	Any Text (128 char. max)	Symbol ID + "PL"
Characteristic		Yes	Single-head, 4 Color Semaphore None Home Approach	Single-head, 4 Color Semaphore
Head A	Enable Semaphore light head	Yes	Enabled, Disabled	Enabled
Flashing	Enable flashing for this head	Yes	Enabled, Disabled	Disabled
Flash Rate	Flash rate for this head	Yes	0, 40,45,50,55,60,65	0
Label Location	Location of symbol label	Yes	Top, Bottom, Left, Right	Bottom (East), Top (West)
Description	Optional text description	Yes	Optional, Any Text (255 char. max)	""

Always contains Red, Yellow, Green and Lunar aspects.

Table 7–22. Semaphore Light Symbol Parameters – Controls

Parameter	State	Description
ASPECT_CALL	CANCEL	Remove the request of permissive signal call
ASPECT_CALL	CALL	Request for signal
ASPECT_CALL	CALL_ON	Request signal for move into occupied territory
ASPECT_CALL	FLEET	Reclear signal to allow following moves

Table 7–23. Semaphore Light Symbol Parameters – Indications

Parameter	State	Description
ACTIVE_ASPECT	A_(aspect color)	Indicates aspect color
ASPECT_STATUS	A_(aspect color)_ OPEN	Indicates the filament status
FLEET		Indicates fleeting enabled If fleeted displays "F" in fleet color Otherwise no "F" displayed
REQUEST_STATUS	PENDING	Indicates signal call is pending If pending signal border = pending color
REQUEST_STATUS	FAILED	Indicates signal call has failed If failed signal border = failed color

7.5 MISCELLANEOUS SYMBOLS

7.5.1 Alternate Traffic

Use this symbol to indicate non-rail traffic (for example, bus routing).

- Toolbar Icon:
- Symbol Image:

Table 7–24. Alternate Track Symbol Attributes

Attribute	Description	User Defined	Possible Entries	Default
Symbol ID	ID number of the symbol	No		Set By Application
Type	Track type	No		Alternate Traffic
Label	Text label of symbol	Yes	Any Text (128 char. max)	Symbol ID + "TR"
Label Location	Location of symbol label	Yes	Top, Bottom, Left, Right, Center	Bottom
Description	Optional text description	Yes	Optional, Any Text (255 char. max)	""

Limiting Parameters – Controls

None

Table 7–25. Alternate Track Symbol Parameters – Indications

Parameter	State	Description
TRACK_STATUS	OCCUPIED	Indicates track occupancy If set track color = occupied Otherwise color = default Set_User_Preferences
TRACK_STATUS	BLOCKED	Indicates a track is blocked from traffic If set track color = blocked OCCUPIED overrides BLOCKED

7.5.2 Grade Crossing

Use this symbol to indicate the state of a grade crossing.

- Toolbar Icon:
- Symbol Image:

Table 7–26. Grade Crossing Symbol Attributes

Attribute	Description	User Defined	Possible Entries	Default
Symbol ID	ID number of the symbol	No		Set By Application
Neighbor - Head		No		Set By Application
Neighbor - Tail		No		Set By Application
Signal Link - Head		No		Set By Application
Signal Link - Tail		No		Set By Application
Type	Grade Crossing type	No		Generic
Loss of Shunt Delay	Time to wait after loss of shunt	Yes	hh:mm:ss.ms	00:00:00.000
Label	Text label of symbol	Yes	Any Text (128 char. max)	Symbol ID + "GX"
Label Location	Location of symbol label	Yes	Top, Bottom, Left, Right, Center	Bottom
Description	Optional text description	Yes	Optional, Any Text (255 char. max)	""

Parameters – Controls

None

Table 7–27. Grade Crossing Symbol Parameters – Indications

Parameter	State	Description
CROSSING_STATUS	OCCUPIED	Indicates track occupancy If set track color = occupied Otherwise color = default
CROSSING_STATUS	BLOCKED	Indicates a track is blocked from traffic If set track color = blocked OCCUPIED overrides BLOCKED
CROSSING_ROUTE		Indicates the crossing is part of a locked route If set track color = route
GATE_STATUS	UP	Indicates the status of the crossing gates If up gate is not displayed and signals are dark *
GATE_STATUS	DOWN	Indicates the status of the crossing gates If down gate is displayed steady and signals are flashing *

* If neither GATE_STATUS.UP nor GATE_STATUS.DOWN is set then the gates and signals are flashing.

7.5.3 Remote/Local Control

Use this symbol to indicate a remote/local control and indication.

- Toolbar Icons:
- Symbol Image:

Table 7–28. Remote/Local Control Symbol Attributes

Attribute	Description	User Defined	Possible Entries	Default
Symbol ID	ID number of the symbol	No		Set By Application
Type	Remote/Local type	No		Remote/Local
Label	Text label of symbol	Yes	Any Text (128 char. max)	Symbol ID + "Gu"
Mode Change Timeout	Change request timeout	Yes	00:00:01:000 to 23:59:59:000	00:00:05:000

Table 7–29. Remote/Local Control Symbol Parameters – Controls

Parameter	State	Description
OP_MODE_CALL	REMOTE LOCAL	Request Remote mode Request Local mode

Table 7–30. Remote/Local Control Symbol Parameters – Indications

Parameter	State	Description
OP_MODE	LOCAL	Indicates the operational mode (Remote/Local)

7.5.4 Timer

Use this symbol to indicate a timer.

- Toolbar Icon:
- Symbol Image:

Table 7–31. Timer Symbol Attributes

Attribute	Description	User Defined	Possible Entries	Default
Symbol ID	ID number of the symbol	No		Set By Application
Type	Text box type	Yes	Generic	Generic
Label	Text label of symbol	Yes	Any Text (128 char. max)	Symbol ID + "TM"
Run Time	Running time of timer	Yes	hh:mm:ss.ms	00:00:00.000
Label Location	Location of symbol label	Yes	Top, Bottom, Left, Right	Bottom
Description	Optional text description	Yes	Optional, Any Text (255 char. max)	""

Parameters – Controls

None

Table 7–32. Timer Symbol Parameters – Indications

Parameter	State	Description
TIMER_STATUS	START	Indicates timer is starting
TIMER_STATUS	RUNNING	Indicates timer is running If running timer = running color
TIMER_STATUS	DONE	Indicates time delay has expired

7.5.5 Generic

Use this symbol for True/False control and/or indication.

- Toolbar Icon:
- Symbol Image:

Table 7–33. Generic Symbol Attributes

Attribute	Description	User Defined	Possible Entries	Default
Symbol ID	ID number of the symbol	No		Set By Application
Label	Text label of symbol	Yes	Any Text (128 char. max)	Symbol ID + "Gn"
Type	Generic type	Yes	Indication only, Control only, Indication & Control	Indication & Control
Color (False)		Yes	See list	Black
Color (True)		Yes	See list	Green
Audible (False)		Yes	See list	Blank
Audible (True)		Yes	See list	Blank
Delay Time	Active pulse time	Yes	hh:mm:ss.ms	00:00:00.000
Protect Flag	Enables "Are you sure?" dialog on control	Yes	Enabled, Disabled	Disabled
Label Location	Location of symbol label	Yes	Top, Bottom, Left, Right	Right
Description	Optional text description	Yes	Optional, Any Text (255 char. max)	""

Table 7–34. Generic Symbol Parameters – Controls

Parameter	State	Description
GENERIC_OUTPUT (if enabled)		True/False Control bit

Table 7–35. Generic Symbol Parameters – Indications

Parameter	State	Description
GENERIC_INPUT (if enabled)		Indicates state of input If set generic color = generic indication

7.5.6 Direction Indicator

Use this symbol to indicate direction of traffic.

- Toolbar Icon:
- Symbol Image:

Table 7–36. Direction Indicator Symbol Attributes

Attribute	Description	User Defined	Possible Entries	Default
Symbol ID	ID number of the symbol	No		Set By Application
Type	Generic type	No		Direction Indicator
Label	Text label of symbol	Yes	Any Text (128 char. max)	Symbol ID + "Gn"
Description	Optional text description	Yes	Optional, Any Text (255 char. max)	""

Parameters – Controls:

None

Table 7–37. Direction Indicator Symbol Parameters – Indications

Parameter	State	Description
GENERIC_TRAFFIC	DIRECTION	Indicates direction of arrow If set arrow is pointing to the left Otherwise arrow is pointing to the right
GENERIC_TRAFFIC	LOCK	Indicates if the direction is locked If locked direction indicator color = locked

7.5.7 Alarm

Use this symbol to indicate an alarm condition.

If an alarm condition occurs, this symbol that actively flashes. If configured, this symbol plays a continuous audbile tone until the alarm is muted or acknowledged:

- Toolbar Icon:
- Symbol Image:

Table 7–38. Alarm Symbol User-Defined Attributes

Attribute	Description	Possible Entries	Default
Symbol ID	ID number of the symbol		Set By Application
Type	Generic type		Direction Indicator
Label	Text label of symbol	Any Text (128 char. max)	Symbol ID + "Gn"
Color (Inactive)	Select separate colors for active and inactive states of alarm symbol.	See list	Red (inactive) Green (active)
Audible	Select an audible tone for the alarm symbol when in the active state.	None, Beep	None
Active State	The state (True or False) that defines when the alarm is active.	True, False	True
Active Label	The label text displayed when the alarm is active.	Any Text (128 char. max)	Blank
Label Location	Select where the symbol's label appears in relation to the symbol.	Left, Top, Bottom, Center, Right	Right
Description	Optional text description	Optional, Any Text (255 char. max)	""

7.5.8 Text Box

Use this symbol to provide a text box to display text:

- Toolbar Icon:
- Symbol Image:

Table 7–39. Text Box Symbol Attributes

Attribute	Description	User Defined	Possible Entries	Default
Symbol ID	ID number of the symbol	No		Set By Application
Type	Text box type	Yes	Static, Numeric	Static
Label	Text label of symbol	Yes	Any Text (128 char. max)	Symbol ID + "TB"
Font Size	Size of symbol label	Yes	10pt, 12pt, 14pt, 16pt, 20pt, 28pt, 36pt, 48pt	10pt

Parameters – Controls

None

Table 7–40. Text Box Symbol Parameters – Indications

Parameter	State	Description
TEXTBOX_VALUE (if type is dynamic)	BIT_1 through BIT_8	Displays a byte length number Number displayed is decimal format (0 .. 255)

SECTION 8 – VPI PORT CONFIGURATION

8.1 VITAL BOARD NETWORK PORTS

In order for MMS to use the Vital diagnostic network port, configure the Vital board as follows:

- Enable networking
- Enable a network port
- Enable diagnostics on the network port
- Assign an IP address to the network port

See the appropriate CAAPE reference manual or online help for specifics on input records.

8.2 NON-VITAL BOARD NETWORK PORTS

For MMS to use the non-vital diagnostic network port, configure the non-vital board as follows:

- Enable networking
- Enable a network port
- Enable diagnostics on the network port
- Assign an IP address to the network port

If a Panel is used, configure a Panel message.

If data logs will be archived, specify a network port.

See the appropriate CAAPE reference manual or online help for specifics on input records.

8.3 COMPILER REPORT OPTIONS

Before compiling each application, ensure that the Listing Reports section of the application's Run Controls includes at least the following options:

- Generate Tracker Information
- Parameters
- Logic Equations

Other listing options can also be selected.

This data must be available in the report file for MMS to display readable variable names and logic statements and playback CSEX Data Logs.

SECTION 9 – MMS COMMUNICATION

This section contains block diagrams describing MMS communications.

9.1 DATA LOG RETRIEVAL PROCESSING

Data log retrieval use DataTrain VIII communications in a multi-drop Master/Slave mode with MMS as the Master. There is no cycled polling; default response timeout is 250 ms. Message fixed at three tries.

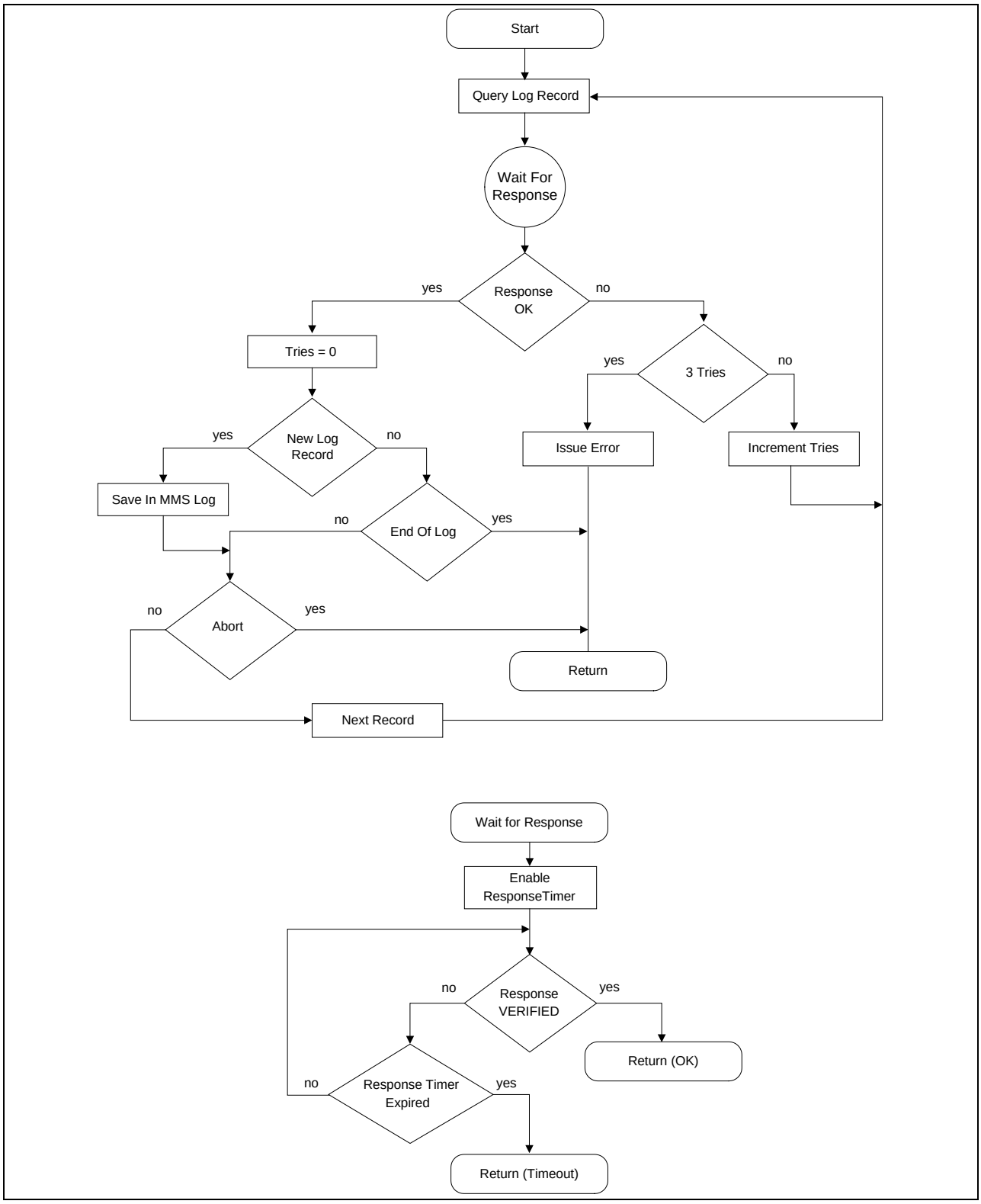


Figure 9–1. Data Log Retrieval Processing

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